D00828701A

TASCAM

TEAC Professional Division

DV-RA1000

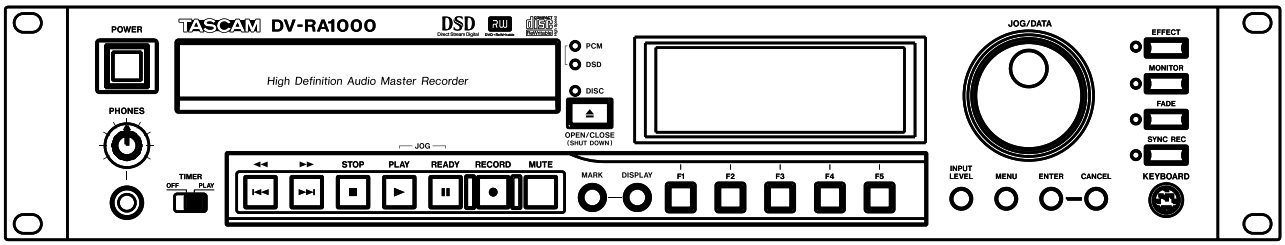
High Definition Audio Master Recorder

OWNER'S MANUAL

DSD Direct Stream Digital

RW DVD+ReWritable

COMPACT disc ReWritable High Speed



IMPORTANT SAFETY PRECAUTIONS

For U.S.A

TO THE USER

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residental area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION
Changes or modifications to this equipment not expressly approved by TEAC CORPORATION for compliance could void the user's authority to operate this equipment.

For the consumers in Europe

WARNING
This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Pour les utilisateurs en Europe

AVERTISSEMENT
Il s'agit d'un produit de Classe A. Dans un environnement domestique, cet appareil peut provoquer des interférences radio, dans ce cas l'utilisateur peut être amené à prendre des mesures appropriées.

Für Kunden in Europa

Warnung
Dies is eine Einrichtung, welche die Funk-Entstörung nach Klasse A besitzt. Diese Einrichtung kann im Wohnbereich Funkstörungen versursachen ; in diesem Fall kann vom Betrieber verlang werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.

CE Marking Information
a) Applicable electromagnetic environment: E4
b) Peak inrush current: 7.5A

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

This appliance has a serial number located on the rear panel. Please record the model number and serial number and retain them for your records.
Model number _____
Serial number _____

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. Grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

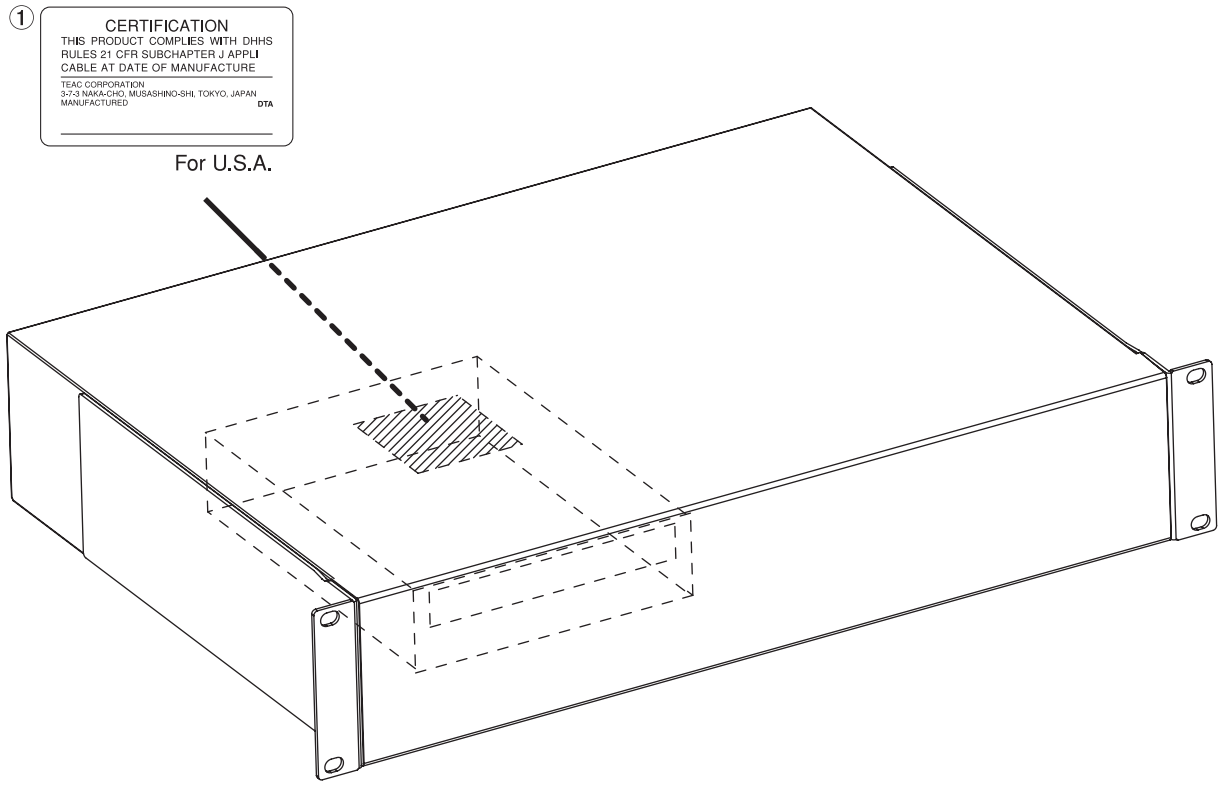
- Do not expose this apparatus to drips or splashes.
- Do not place any objects filled with liquids, such as vases, on the apparatus.
- Do not install this apparatus in a confined space such as a book case or similar unit.
- The apparatus draws nominal non-operating power from the AC outlet with its POWER switch in the off position.

SAFETY INFORMATION

This product has been designed and manufactured according to FDA regulations “title 21, CFR, chapter 1, subchapter J, based on the Radiation Control for Health and Safety Act of 1968", and is classified as a class 1 laser product. There is no hazardous invisible laser radiation during operation because invisible laser radiation emitted inside of this product is completely confined in the protective housings.
The label required in this regulation is shown in ①.

CAUTION

- DO NOT REMOVE THE PROTECTIVE HOUSING USING A SCREWDRIVER.
- USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.
- IF THIS PRODUCT DEVELOPS TROUBLE, CONTACT YOUR NEAREST QUALIFIED SERVICE PERSONNEL, AND DO NOT USE THE PRODUCT IN ITS DAMAGED STATE.



For U.S.A.

Optical pickup:	
Type	: SRU3532
Manufacturer	: Sankyo
Laser output	: Less than 103mW on the objective lens
Wavelength	: 779–789nm (CD), 652–660nm (DVD)

1 – Introduction

CD-R and CD-RW 7
DVD+RW 7
About this manual 7
Notes and warnings 7
Copyright 8
Some notes and precautions 8
Installation 8
Environmental considerations 8
Unpacking the unit 9
Beware of condensation 9
About CD-R and CD-RW discs 9
Handling of optical discs 10
Additional notes with regard to CD-R and CD-RW discs 10
Never use a stabilizer or printable discs 11
About DVD+RW discs 11

2 – Connections

Analog audio connections 12
Digital audio connections 12
AES/EBU 12
S/PDIF 12
SDIF-3/DSD-raw 12
Other connections 13
WORD SYNC 13
USB 13
CONTROL I/O 13
REMOTE IN 13
PHONES 13

3 – Basic principles

The “home” screen 14
Naming files, projects, marks, etc. 14
Using a keyboard 14
Working without a keyboard 14
Adding project notes 14
Clock/calendar 15
Setting the clock 15
Checking the battery level 15
Changing the display contrast 15
Menu operations 16
The virtual front panel (VFP) 17
To launch the virtual front panel 17
ARDY (auto-ready) 17
ACUE (auto-cue) 17
ASPC (auto-space) 17
SNGL (single) 17
RPT (repeat) 17
PGM (program) 17
ATRK (auto-track) 17
RMODE (recording mode) 17
MONO 17
PITCH 17
NSD (noise-shaped dithering) 17
OSC (oscillator) 17
FINALIZE 17
UNFINALIZE 17
ERASE 17
General preferences 18
Meter release 18
Meter hold time 18
Calendar display 18
Time zone 18
Short cuts 18
Reference level 19
Resume playback 19
Remote control unit 20
Skip (between tracks) and search (within tracks) keys 20
Number keys 20
Dedicated function keys 20
MARK and LOCATE keys 20
Soft F-keys 20
JOG/DATA keys 20
Timer start 21
Selecting the input source 21
Adjusting the input level 22
A note on metering 22
Selecting the reference clock 22

4 – CD playback & recording

Playback 23
Display 23
Moving playback position within a disc 23
Programmed playback 23
Repeat playback 24
A-B repeat 24
Jog playback 24
Pitch change 24
Auto cue 24
Setting the threshold level 25
Auto ready 25
Recording 25
MUTE key 25
Auto track increment 26
Coaxial input 26
AES/EBU and analog inputs 26
Fades 26
Monitoring 26
Oscillator 27
Dithering 27
Copy protection 27
Finalizing discs 27
Unfinalizing discs 28
Erasing discs (CD-RW) 28
Synchronized recording 28
Rehearsed synchronized recording 28
Making the recording 29
About marks 29
Jumping to a mark 29
Editing marks 30

Contents

5 – DVD playback & recording

Organization of projects and files 31
Important note on the file system 31
Shut down 32
Recording times and track lengths 32
Starting a new disc 32
Adding a new project 33
Adding notes to a project 33
Changing the current project 33
Changing the name of a project 34
Deleting a project from disc 34
Formatting a disc 34
Recording files to disc 34
Recording mode 35
Normal 35
Assemble 35
Playing back files 35
Play lists 35
Setting marks 36
Erasing a file 36
Renaming a file 36
Editing files 36
Combining files 36
Dividing files 37
Undo and redo 37

6 – Effects

Setting up the effect position 38
Equalization 38
Dynamics processor 39

7 – Use with a computer

Connecting the DV-RA1000 to a computer 40
Disc types that can be used in USB mode 40
Disconnecting from Windows 2000 / XP systems 40
Disconnecting from Mac OS X systems 41
After "ejecting" from the computer 41
Using the DV-RA1000 discs in a computer 41

8 – Specifications, etc.

Analog I/O 42
Digital I/O 42
Other connections 43
Audio performance 44
Physical, etc. specifications 44
Dimensional drawing 45
Block diagram 46

List of Figures and Tables

Figure 1.1: Installing the DV-RA1000 8
Figure 1.2: CD-RW logos 9
Figure 1.3: Handling of CDs 10
Figure 1.4: Cleaning CDs 10
Figure 1.5: Avoid using non-circular discs 10
Figure 1.6: DVD+RW logo 11
Figure 2.1: Rear panel connections 12
Figure 3.1: The CD home screen 14
Figure 3.2: The DVD home screen 14
Figure 3.3: Editing the clock settings 15
Figure 3.4: Battery level 15
Figure 3.5: Using the DV-RA1000 menu system . . . 16
Figure 3.6: Virtual front panel (i) 17
Figure 3.7: Virtual front panel (ii) 17
Figure 3.8: The preference screens 18
Figure 3.9: Setting up short cuts 18
Figure 3.10: Chief features of the RC-RA1000 20
Figure 3.11: Selecting the input source 21
Table 3.12: Digital input source options 21
Figure 3.13: Input level settings 22
Figure 3.14: Word sync selection 22
Figure 4.1: Programmed playback 23
Figure 4.2: Pitch control 24
Figure 4.3: Setting the threshold level 25
Figure 4.4: Setting fade times 26
Figure 4.5: Oscillator screen 27
Figure 4.6: Rehearsing synchronized recording 29
Figure 4.7: The locate list 29
Figure 4.8: Editing a mark 30
Table 5.1: Sampling frequencies and recording times 32
Figure 5.2: New project 32
Figure 5.3: Adding notes to a project 33
Figure 5.4: Loading a project 33
Figure 5.5: Editing a play list 35
Figure 5.6: Editing file names 36
Figure 5.7: Editing file names (ii) 36
Figure 5.8: Confirming a file combine operation . . . 37
Figure 5.9: Confirming a file divide operation 37
Figure 6.1: Effect setting screen 38
Figure 6.2: EQ setting screen 38
Figure 6.3: Dynamics crossover screen 39
Figure 6.4: Dynamics processor band settings 39
Figure 7.1: Disconnecting the DV-RA1000 40
Figure 8.1: Dimensions of the DV-RA1000 45
Figure 8.2: Block diagram 46

Thank you for choosing the DV-RA1000. This unit provides you with the world's most advanced method of recording high-resolution stereo audio on low-cost removable, reusable media.

Fitted with digital I/O in all common formats, including SDIF-3 (Direct Stream Digital), as well as high-quality AD and DA conversion: the DV-RA1000 allows you to record and play back the following types of disc:

CD-R and CD-RW These become standard CD-DA discs to Red Book standard. When recording these discs, the DV-RA1000 acts as a CD recorder, with standard features such as synchronized recording, etc.

The DV-RA1000 can also play back standard commercial audio CDs.

DVD+RW These discs are used to record audio files which are compatible with computer based digital audio workstations, and recording can take place at standard (44.1k/48k), double (88.2k/96k), or quad-frequency (176.4k/192k) sampling frequencies (all at 24-bit), as well as in DSD format. These discs are therefore suitable for 2-track mixdown and archival purposes as well as high definition live recording.

The discs created in this way are in UDF 1.5 format. This format is readable by personal computer systems.

The DV-RA1000 may be connected to a personal computer through a USB 2.0 connection, and these files can be transferred for further processing, editing and mastering. The files may then be used for the production of high-resolution, high-sampling frequency SACD and DVD-Audio, etc. media, as well as for more conventional CDs.

In addition, the DV-RA1000 provides digital effects: a 3-band EQ with a fully-parametric mid band, and a dynamics processor operating in one or three bands as either a compressor or expander. These effects may be inserted on recording (and the effect written to disc) or playback.

About this manual

In this manual, we use the following conventions:

- The names of keys and controls are given in the following typeface: **ERASE**.
- When the display shows a message, this is shown in the following typeface: Welcome.

The sections of this manual are arranged as follows:

1 – "Introduction" (p. 7) This section, introducing the features and concepts of the DV-RA1000.

2 – "Connections" (p. 12) Connections, as well as a description of the remote control unit.

3 – "Basic principles" (p. 14) Basic principles and common operations with the DV-RA1000.

4 – "CD playback & recording" (p. 23)

Using the DV-RA1000 as a CD player and CD recorder.

5 – "DVD playback & recording" (p. 31)

Using the DVD recorder facilities of the DV-RA1000.

6 – "Effects" (p. 38) The built-in effects (EQ and dynamics) you can use with the DV-RA1000 on recording or playback.

7 – "Use with a computer" (p. 40) Basic information on using the DV-RA1000 with a personal computer.

8 – "Specifications, etc." (p. 42) Facts and figures about the DV-RA1000.

Notes and warnings

TIP

We give hints and tips on using the DV-RA1000 in this way.

NOTE

These notes provide additional explanations for special cases, etc.

CAUTION

Cautions show that you may lose data or performance may suffer if the instructions are not followed.

WARNING

These warnings should be taken very seriously. They describe situations which can cause injury, or damage to equipment if the instructions are not followed.

Copyright

Windows, Windows XP, Windows 2000, Windows Me, Windows 98 and Windows 95 are trademarks of Microsoft Corporation.

Macintosh, MacOS, and MacOS X are trademarks of Apple Computer.

NOTE

This product is designed to help you record and reproduce sound works to which you own the copyright, or where you have obtained permission from the copyright holder or the rightful licensor. Unless you own the copyright, or have obtained the appropriate permission from the copyright holder or the rightful licensor, your unauthorized recording, reproduction or distribution thereof may result in severe criminal penalties under copyright laws and international copyright treaties. If you are uncertain about your rights, contact your legal advisor. Under no circumstances will TEAC Corporation be responsible for the consequences of any illegal copying performed using the DV-RA1000.

Some notes and precautions

Treat the DV-RA1000 as you would any other piece of precision equipment.

Avoid exposing it to extremes of temperature and humidity and avoid mechanical shocks and vibration.

Keep the unit away from strong magnetic fields (TV sets, computer monitors, large electric motors, etc.).

Installation

Install the DV-RA1000 into a 2U rack space using the supplied mounting kit (you may want to remove the feet first).

WARNING

As the unit may become hot during operation, always leave sufficient space above the unit for ventilation. If you are mounting the unit in a rack, leave 1U of space above it. Allow at least 10 cm (4 in) at the rear of the unit for ventilation.

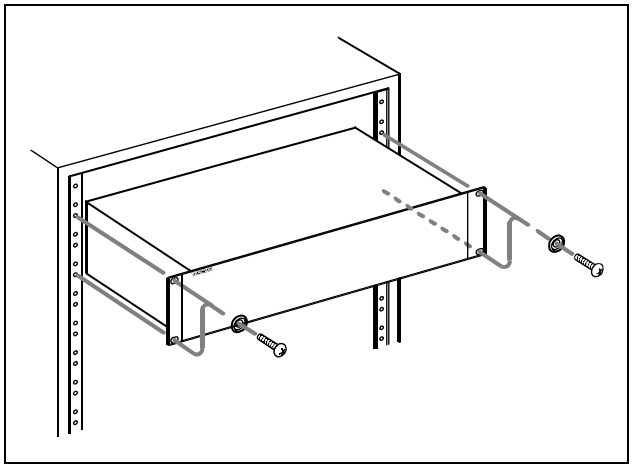


Figure 1.1: Installing the DV-RA1000

Environmental considerations

The DV-RA1000 may be used in most areas, but to maintain top performance, and prolong operating life, observe the following environmental conditions:

The nominal temperature should be between 5°C and 35°C (41°F and 95°F). The DV-RA1000 is more sensitive to extremes of temperature than ordinary CD players.

Relative humidity should be 30% (5°C/41°F) to 80% (32°C/90°F).

You should not place the unit on a piece of equipment generating heat, e.g. an amplifier, to avoid possible problems with overheating.

Make sure that the unit is mounted in a level position for correct operation. Do not mount the unit in a rack tilted 5° or more from the vertical position.

NOTE

If the mounting surface is more than 5 degrees away from the horizontal, the tray will not open or close.

The voltage supplied to the unit should match the voltage as printed on the rear panel. If you are in any doubt regarding this matter, consult an electrician.

Unpacking the unit

When you unpack the unit, make sure that you have, in addition to the unit itself:

- The RC-RA1000 wired remote control unit, with 5m (15ft) of cord
- Power cord
- A rack mounting kit (screws and washers)
- Warranty information
- A *Quick Reference Guide*.

NOTE

When transporting the unit, always use the original packing materials. For this reason, we strongly recommend that you save all the packing materials that came with the DV-RA1000, in case you need to transport it in the future.

In addition, when transporting the unit, you should tape the disc tray closed, using an adhesive tape that will not spoil the finish of the unit.

Beware of condensation

If the unit (or a disc) is moved from a cold to a warm place, or used after a sudden temperature change, there is a danger of condensation; vapor in the air could condense on the internal mechanism, making correct operation impossible. To prevent this, or if this occurs, leave the player for one or two hours with the power turned on, then turn the power off and on again.

About CD-R and CD-RW discs

The DV-RA1000 uses CD-R and CD-RW media, and can also use CD-R and CD-RW Digital Audio media.

- CD-R media up to 48x are supported.
- Use only CD-RW media rated at 1x to 4x (Multi Speed) or 4x to 10x (High Speed). Audio CD-RW media are generally unmarked, but fall within these limits. The DV-RA1000 cannot record on Ultra Speed, and Ultra Speed+ (that is, over 8x) CD-RW media.

In this manual, when we refer to “CD-R” and “CD-RW” discs, we always include “CD-R Digital Audio” and “CD-RW Digital Audio”, even when this is not explicitly stated.

CD-R discs can be recorded once only. Once they have been used for recording, they cannot be erased or re-recorded. However, if space is available on the disc, additional material can be recorded.

By contrast, a CD-RW disc can be used in much the same way as a CD-R disc, but the disc can be erased, and the disc can be re-used for other recordings. The packaging of CD-RW discs will include one of the following logos:

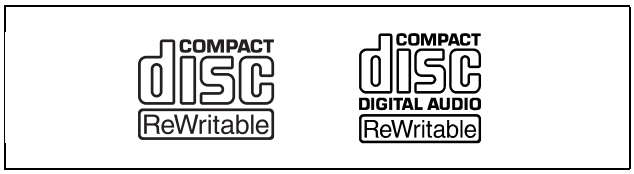


Figure 1.2: CD-RW logos

However, you should note that an audio CD created using a CD-RW disc may not play back satisfactorily on every audio CD player. It will, naturally, be playable on the DV-RA1000. This is in no way a limitation of the DV-RA1000 itself, but of the difference between the different types of media and the methods used to read them.

CD-R discs created on the DV-RA1000, by contrast, may be played satisfactorily on the majority of audio CD players.

Handling of optical discs

Observe the following:

- Always place discs in the tray with their label facing upward (discs used in the DV-RA1000 can only be played on one side).
- To remove a disc from its storage case, press down on the center of the case, and lift the disc out, holding it carefully by the edges.

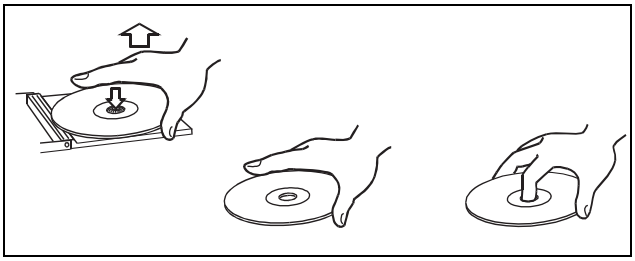


Figure 1.3: Handling of CDs

- Finger marks and dust should be carefully wiped off the disc's recorded surface with a soft cloth. Unlike conventional records, the compact disc has no grooves to collect dust and microscopic debris, so gently wiping with a soft cloth should remove most particles.
- Wipe in a straight motion from the inside to the outside of the disc. Small dust particles and light stains will have absolutely no effect on reproduction quality.

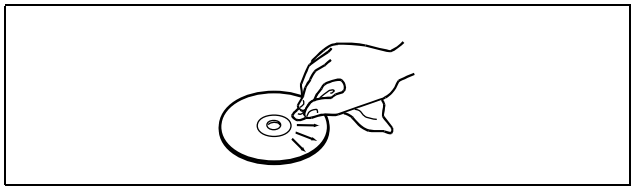


Figure 1.4: Cleaning CDs

- Never use such chemicals as record sprays, antistatic sprays or fluid, benzine or thinner to clean compact discs. Such chemicals will do irreparable damage to the disc's plastic surface.
- Discs should be returned to their cases after use to avoid serious scratches that could cause the laser pickup to "skip".
- Don't expose discs to direct sunlight or high humidity and temperature for extended periods. Long exposure to high temperature can warp the disc.
- Only use circular discs. Avoid using non-circular promotional, etc. discs.

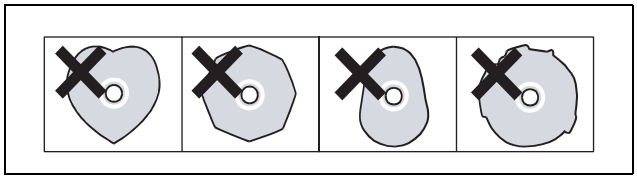


Figure 1.5: Avoid using non-circular discs

- To keep the laser pickup clean, and don't touch it. For the same reason, don't leave the disc tray opened unnecessarily.

Additional notes with regard to CD-R and CD-RW discs

There are additional precautions that you should take when handling CD-R and CD-RW discs, that are different to those that you should take when handling ordinary CDs.

- Avoid touching the recording (non-label) side of a disc on which you will be recording. Recording on a disc requires a cleaner surface than playing back, and fingerprints, grease, etc. can cause errors in the recording process.
- CD-R discs are more sensitive to the effects of heat and ultraviolet rays than ordinary CDs. It is important that they are not stored in a location where direct sunlight will fall on them, and which is away from sources of heat such as radiators or heat-generating electrical devices.
- Always store CD-R discs in their "jewel cases" to avoid dirt and dust accumulating on their surfaces.
- Do not put labels or protective sheets on the discs and do not use any protective coating spray.
- When labeling CD-R discs, always use a soft oil-based felt-tipped pen to write the information. Never use a ball-point or hard-tipped pen, as this may cause damage to the recorded side.
- Dirty discs may be cleaned using a soft dry cloth and/or a commercial CD cleaning fluid or ethyl alcohol. Do not use thinner, gasoline, benzene or LP cleaning fluid, as these will damage the disc.
- If you are in any doubt as to the care and handling of a CD-R disc, read the precautions supplied with the disc, or contact the disc manufacturer directly.

- Do not use 8cm (single) discs, “business card” discs or any discs which are not the standard 12cm disc for recording, as the DV-RA1000 cannot record on them.

Never use a stabilizer or printable discs

Using commercially available CD stabilizers or printable recordable discs with this player will damage the mechanism and cause it to malfunction.

NOTE

Never use a disc that has had a stabilizer mounted to it. The residual adhesive may cause the disc to stick to the mechanism of the DV-RA1000. If it sticks to the mechanism, you will need a technician to get it out.

About DVD+RW discs

The DV-RA1000 uses DVD+RW media for digital audio data recording and storage.

As with recordable CDs, DVD+RW media can have data erased, and the whole disc can be erased and reused a number of times.

The DV-RA1000 supports normal speed (2x – 4x) discs. It does *not* support hi-speed (4x – 10x) or ultra-speed discs (10x – 24x).

NOTE

Though the DV-RA1000 has been tested with a wide variety of commercial discs and media, you should be aware that some discs may contain manufacturing defects, etc. which make them unsuitable for use with the DV-RA1000.

The packaging for rewritable DVD+RW media include the following logo:

Figure 1.6: DVD+RW logo

See “DVD playback & recording” on page 31 for more details regarding the use of DVD+RW media with the DV-RA1000.

CAUTION

Although the theoretical number of times that a DVD+RW disc can be re-written is 1,000 times, the actual number of re-write operations possible on a disc when used in the DV-RA1000 may be significantly less than this. This is due both to the way in which the DV-RA1000 uses the disc, and to the differences between media brands.

*For this reason, to maintain data integrity, TASCAM strongly recommends the use of **new** DVD+RW discs for important recordings.*

In addition, when performing editing functions on the DV-RA1000, it is suggested that the files are backed up from DVD+RW disc to a personal computer (as WAV files) before starting the editing operations. See “Use with a computer” on page 40 for details.

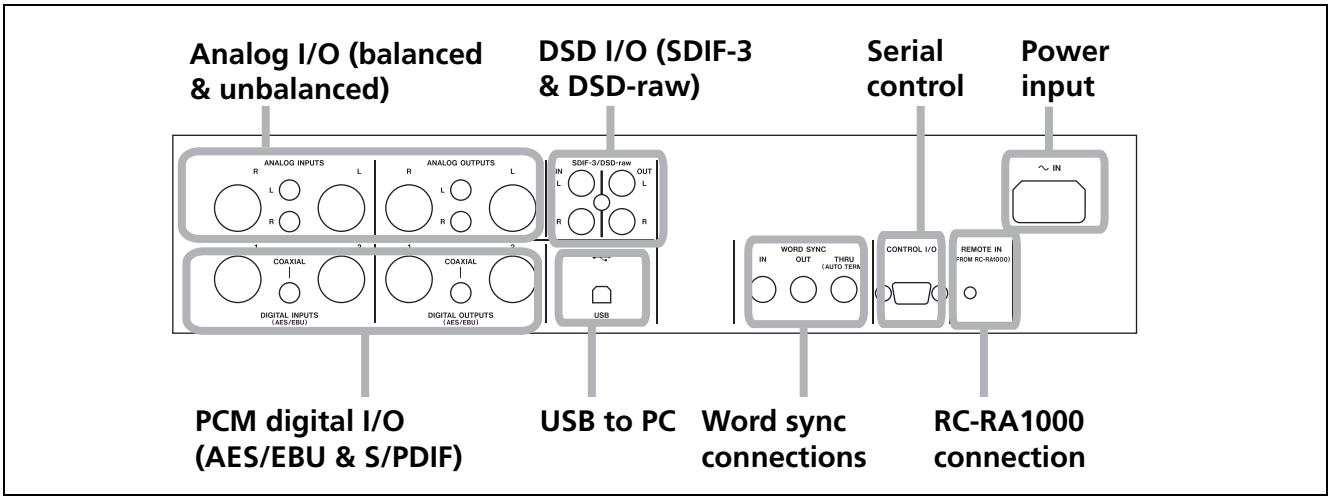


Figure 2.1: Rear panel connections

Analog audio connections

The DV-RA1000 can accept and output both balanced +4dBu and unbalanced –10dBV signals.

Use the XLR jacks, wired as 1=ground, 2=hot, 3=cold for balanced connections, and the RCA (pin) jacks for unbalanced connections.

On playback or monitoring, audio is always output from both sets of connectors in parallel.

Digital audio connections

The DV-RA1000 can accept digital audio data from one of three sources, each corresponding to a different audio format, and can output digital data from the equivalent type of connector, and in the same format as it receives data.

AES/EBU Note that while AES/EBUs connections usually use one XLR connector for a stereo pair, the DV-RA1000 is provided with two connectors for input and output.

NOTE

Strictly speaking, the format used by these connectors is called IEC-60958-4, or AES-3-1992.

When working in double-frequency mode (sampling frequencies of 88.2 or 96 kHz), there is an option of either using one XLR connector at double speed (*double-speed*), or two connectors, each at normal speed (*double-wire*). If only one XLR connector is being used, connections should be made only to XLR connector 1 (input and output).

In quad-frequency (176.4 or 192kHz) modes, both connectors are used at double speed (double-speed and double-wire).

S/PDIF These RCA pin jacks are labeled as **COAXIAL** on the rear panel. The format is S/PDIF (IEC60958).

These jacks can accept and transmit data at single-speed (44.1 and 48kHz) or at double-speed (88.2 or 96kHz).

SDIF-3/DSD-raw These BNC connectors accept and output digital audio data in SDIF-3 (DSD-Raw) format. Each connector carries one channel of the stereo pair.

CAUTION

When using DSD connections, all digital audio units in the system, including the DV-RA1000, must be synchronized to a common clock signal. On the DV-RA1000, if this signal is external, a 44.1kHz signal should be supplied at the **WORD SYNC IN** *terminal. Alternatively, the DV-RA1000 can be set to act as the system clock master, at 44.1kHz, with the DSD audio source acting as the clock slave. See "Selecting the reference clock" on page 22.*

Other connections

WORD SYNC The DV-RA1000 is fitted with three BNC connectors for standard word sync.

CAUTION

There should be one, and only one clock master in a setup.

IN receives word sync from an external source, and **OUT** is used when the DV-RA1000 is used as the word sync master in a setup, outputting the frequency of the current project. **THRU** echoes the sync received at **IN** and is terminated automatically if nothing is connected.

NOTE

When in DSD recording mode, the DV-RA1000 inputs and outputs word sync at 44.1kHz. Under these conditions, the input sync can be ±6% away from the norm.

USB Connect a suitably-equipped computer using a USB 2.0 cable. The DV-RA1000 appears as a mass storage device, requiring no driver software.

The computer can be used to read data files, etc. from discs loaded in the DV-RA1000, but cannot write files that can then be played by the DV-RA1000.

CONTROL I/O You can use RS-232C serial control with the DV-RA1000 by connecting an appropriate cable to this connector. Consult your TASCAM distributor for details of pin-outs, protocols, etc.

REMOTE IN Connect only the supplied wired RC-RA1000 remote control unit to this jack.

PHONES Connect a standard set of stereo headphones to this front panel 1/4" jack. Adjust the level with the control above the jack.

The "home" screen

The DV-RA1000 has two types of "home screen", depending on whether a CD or DVD disc is being used.

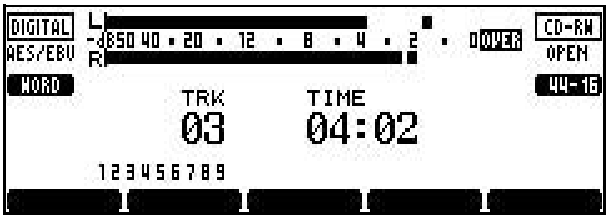


Figure 3.1: The CD home screen

TIP

These screens are often accessible from other screens by pressing the **F5** *key (which is then marked as* HOME *on the display).*

Figure 3.2: The DVD home screen

Naming files, projects, marks, etc.

Using a keyboard When recording on DVD, the easiest way to name files ("Renaming a file" on page 36) and projects ("Changing the name of a project" on page 34), and create project notes ("Adding notes to a project" on page 33), etc. is using a computer PS/2 keyboard (US standard layout) connected to the front panel of the DV-RA1000.

WARNING

Do not connect or disconnect such a keyboard to or from the DV-RA1000 with the power turned on as this may damage the DV-RA1000 and/or the keyboard.

Basically, you can use this keyboard in the usual way, including some punctuation characters for notes, but punctuation is not available for titles of projects and files. The [Delete] and [Backspace] keys work as you expect.

Start editing titles with the keyboard by pressing the keyboard's left or right cursor key (or **F3** or **F4** on the DV-RA1000).

Finish by pressing the keyboard's [Enter] key.

NOTE

You may experience a few small incompatibilities with punctuation symbols, etc. if you use a keyboard that does not conform to the standard 101-key US layout (or the Japanese 106-key layout).

Working without a keyboard However, if such a keyboard is not available, you can use the front panel to name disc items.

When a screen allowing you to name an item (project or file) is shown on the display, highlight it so that it is shown in inverse video.

Press the **F4** (right) key to start the naming process.

Use the dial to scroll through the set of currently available characters.

The available character sets are changed using the **F1** (up) and **F2** (down) keys. These cycle through CAPS (all UPPERCASE letters from A through Z and space), SMALL (lowercase letters from a through z and space) and NUM (digits from 0 through 9 and space).

Move backwards and forwards using the **F3** and **F4** keys. Press **ENTER** when done.

NOTE

Accented characters and punctuation are not available for names.

Adding project notes Notes are done in the same way, except that here there are no character sets which can be selected, and punctuation, etc. is available.

The arrow keys act as cursor keys to navigate around the text block.

Use the **ENTER** key to add carriage returns and the **CANCEL** key as a delete key.

Use the wheel to scroll through the numbers, punctuation characters and uppercase and lowercase letters available for the text.

Note that the text can contain more lines than the size of the screen, and can be scrolled up or down.

When you've finished entering text, press and hold the **ENTER** key for about a second to confirm the entry before writing it to disc (see "Important note on the file system" on page 31).

Clock/calendar

The DV-RA1000 contains a battery-powered clock/calendar which timestamps all files recorded on a DVD disc. These timestamps are not visible from the DV-RA1000, but may be viewed as part of the file metadata when the unit is connected to a computer (see "Use with a computer" on page 40).

Setting the clock follow these steps:

1 **From the home screen, press the MENU key and select** SYSTEM SETUP**. Press ENTER.**

2 **Select** CALENDAR **and press ENTER.**

Figure 3.3: Editing the clock settings

The currently-set date is shown in "military" (year/month/day) format, as above or in US/Japanese format (month/day/year) format. You can change this with the preferences (see "Calendar display" on page 18). Also note the time zone setting in the preferences, which allows you to compensate for time differences if your project crosses to another time zone for mastering, etc.

3 **Use the cursor keys to navigate around the fields, and the wheel to change values.**

NOTE

The clock uses 24-hour format, i.e. 16:24 *is used, rather than* 4:24pm*.This cannot be changed.*

Checking the battery level The level of the battery used to back up the calendar and various settings, etc. can be checked in the following way:

1 **From the home screen, press the MENU key and select** SYSTEM SETUP**. Press ENTER.**

2 **Select** CHECK **and press ENTER.**

3 **Press F2 (**BATTERY**):**

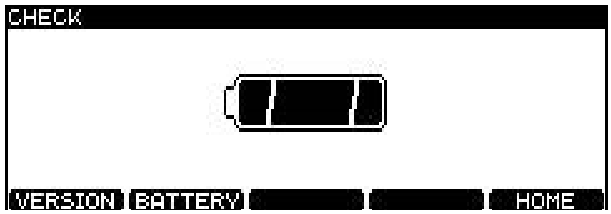


Figure 3.4: Battery level

The battery should last for several years from the date of purchase. Contact your TASCAM distributor if the battery check shows "NEED TO CHANGE" or "Empty".

NOTE

The VERSION *screen, also accessed from the* CHECK *item, shows the version, etc.of the firmware which is currently installed.*

Changing the display contrast

To set and change the display contrast:

1 **Press and hold the DISPLAY key.**

2 **While pressing and holding the DISPLAY key, turn the wheel until the display is a suitable contrast to suit your lighting and viewing angle.**

Menu operations

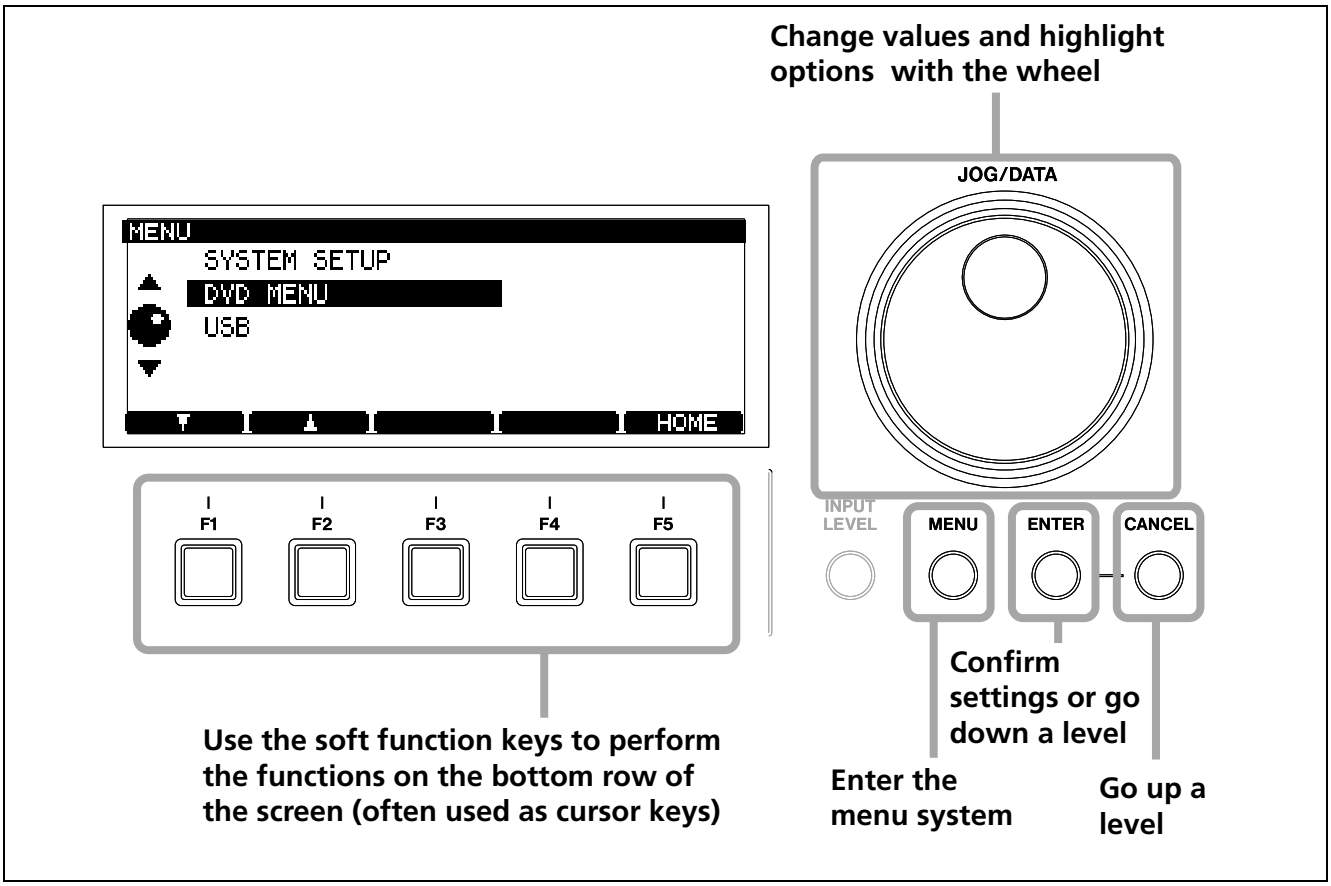


Figure 3.5: Using the DV-RA1000 menu system

To enter the main setting menu of the DV-RA1000:

1 **Press the MENU key. The main menu appears.**

2 **Use the wheel (or the F1 and F2 keys on the main unit or RC-RA1000 remote control unit) to move up and down the menu.**

3 **Press ENTER to enter the selected menu item.**

Also use the ENTER key to confirm the settings of a screen. Pressing ENTER on a screen with many settings will confirm all these settings at once, and return to the previous menu level.

- **CANCEL returns up a screen**
- **When the F5 key is labeled as HOME on the on-screen label, pressing it returns to the home screen.**

NOTE

Note that the menu system usually cannot be accessed while the unit is recording and many operations cannot be carried out while playing back.

We suggest that you pause or stop playback before trying to enter the menu system.

The virtual front panel (VFP)

The DV-RA1000 allows access to many functions through the virtual front panel, providing a graphical representation of many of the keys and controls that might be hardware switches on other units.

Note that many of these functions are hardware keys on the remote control unit.

To launch the virtual front panel

1 **From the home screen, press the ENTER key.**

The virtual front panel appears.

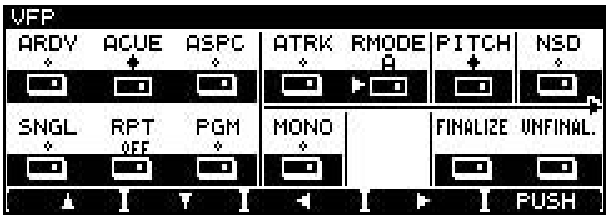


Figure 3.6: Virtual front panel (i)

There are two more "soft switches" to the right of the initial screen. Keep pressing the F4 key to see these (go back to the original screen using the F3 key).

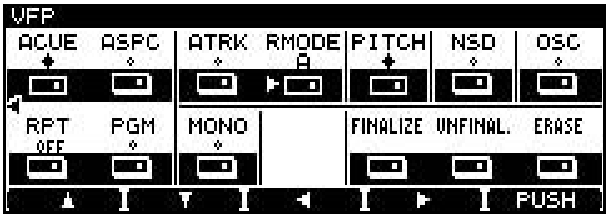


Figure 3.7: Virtual front panel (ii)

- **Press CANCEL to exit the virtual front panel.**

Use the arrow keys to move around the front panel, and the **F5** (PUSH) key to turn the "soft switches" on and off.

Some soft switches, when turned on, present a menu of choices, but others just toggle between on and off.

The switches are grouped by function:

ARDY (auto-ready) Is used to switch auto-ready playback mode on and off. See "Auto ready" on page 25.

ACUE (auto-cue) Is used to cue up playback to the first point on the track where the audio level goes above a preset threshold. See "Auto cue" on page 24.

ASPC (auto-space) Automatically puts spaces between tracks on playback.

SNGL (single) Enters single-track playback mode.

RPT (repeat) Sets the playback repeat mode between OFF (off), ALL (all tracks of the disc are repeated) and 1Tr (the current track is repeated).

PGM (program) Turns programmed playback on and off, and allows setting of the programmed playback mode ("Programmed playback" on page 23).

ATRK (auto-track) Turns the auto track function on and off when recording ("Auto track increment" on page 26).

RMODE (recording mode) Switches the PCM DVD recording mode between "normal" and "assemble" modes (see "Recording mode" on page 35).

MONO Turns mono monitoring on and off.

PITCH Allows speed and pitch to be varied by ±6% (see "Pitch change" on page 24).

NSD (noise-shaped dithering) Allows dithering to be turned on and off (only when recording CDs) when reducing the bit length from 24 to 16 bits. See "Dithering" on page 27.

OSC (oscillator) Allows a line-up oscillator signal to be output ("Monitoring" on page 26).

FINALIZE Finalizes CD-R and CD-RW discs, writing the TOC, and allowing them to be played on regular recorders ("Finalizing discs" on page 27).

UNFINALIZE Removes the TOC from CD-RW discs, allowing further recording on them ("Unfinalizing discs" on page 28).

ERASE Erases a track or tracks from CD-RW discs, allowing them to be used again.

General preferences

There are a number of preferences that can be applied to the DV-RA1000 in order to help adapt the unit to your working style.

1 **Press the MENU key, and use the wheel to select** SYSTEM SETUP**. Press ENTER.**

2 **Use the wheel to select** PREFERENCE**. Press ENTER.**

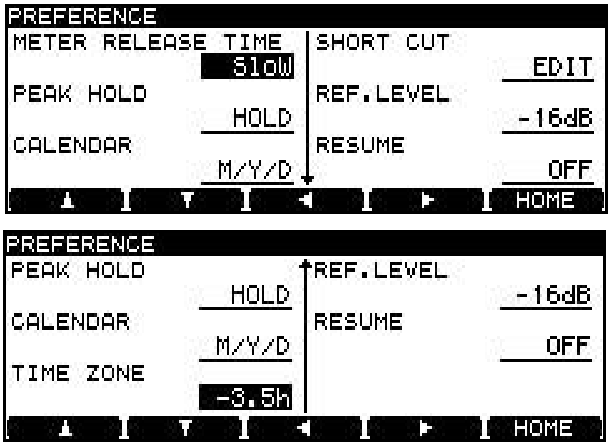


Figure 3.8: The preference screens

3 **Use the F1 through F4 keys as cursor keys to navigate around the screen, and the wheel (except for the short cut parameter) to change the highlighted parameter, as detailed below.**

Use the down arrow key (F2) to reach the lower screen (showing the time zone parameter)

4 **Press ENTER to return to the** SYSTEM SETUP **menu after changing the settings.**

Meter release (METER RELEASE TIME) This parameter can be set to Slow, Mid, or Fast.

Meter hold time (PEAK HOLD) This parameter can be set to OFF, 1 or 2 seconds (1s or 2s) or HOLD, in which the peak reading is held until this parameter is reset.

Calendar display (CALENDAR) You can select whether the dates used to stamp DVD files are shown in US/Japanese style (M/D/Y) or in "military" style with the year first (Y/M/D). Setting the calendar is described in "Setting the clock" on page 15.

Time zone (TIME ZONE) allows you to set up your local time zone (expressed relative to GMT). This may be useful if the discs containing your files are moved to different time zones.

Short cuts (SHORT CUT) This function allows you to set up the function keys as short cuts to commonly-accessed menu items. To set up these short cuts, highlight this item, and press **ENTER**:

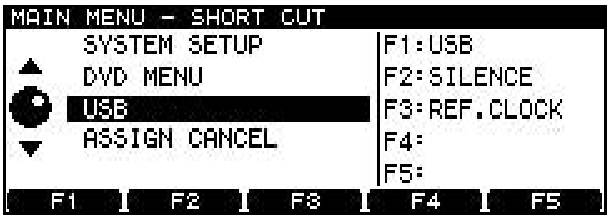


Figure 3.9: Setting up short cuts

- **On the left of the screen, the menu system is shown, and on the right are the current short cut assignments of the five function keys (blank for unassigned keys).**
- **Use the wheel and ENTER and CANCEL keys to navigate through the menu system.**
- **When the menu item to act as a short cut is selected, press the function key to which it will be assigned. The menu title then appears on the right of the screen beside the function key.**
- **When all short cuts have been assigned, press and hold the ENTER key. This confirms the settings and returns to the** PREFERENCE **screen.**
- **Pressing that function key from the home screen will now jump to the menu item assigned here.**

NOTE

The default settings for the function keys are:

F1: Input Select

F2: Reference Clock

F3: Calendar

F4: Preference screen

F5: Save UDF Management Information

Reference level (REF.LEVEL)This is the amount of headroom above the nominal 0dB — in other words, what level corresponds to 0dBFS.

This setting applies only to the balanced XLR analog I/O jacks (and not to the unbalanced RCA analog connectors).

You can select between –16dB, –18dB and –20dB to match your local working practices.

Resume playback (RESUME) The DV-RA1000 can be set to resume playback or recording from the point where it stopped when the **STOP** key is pressed. When recording, this is similar to assemble recording on DVD discs (see "Recording mode" on page 35).

This point is retained even when the unit is powered off. Select either ON or OFF for this option.

TIP

You can press **STOP** *and the rewind key together to return to zero.*

NOTE

This function also works when recording on DVD+RW media.

Remote control unit

Since the supplied RC-RA1000 remote control unit is a wired unit, no batteries are necessary, and it does not need to point at the DV-RA1000 for operation.

The keys on the remote control unit complement those on the main unit.

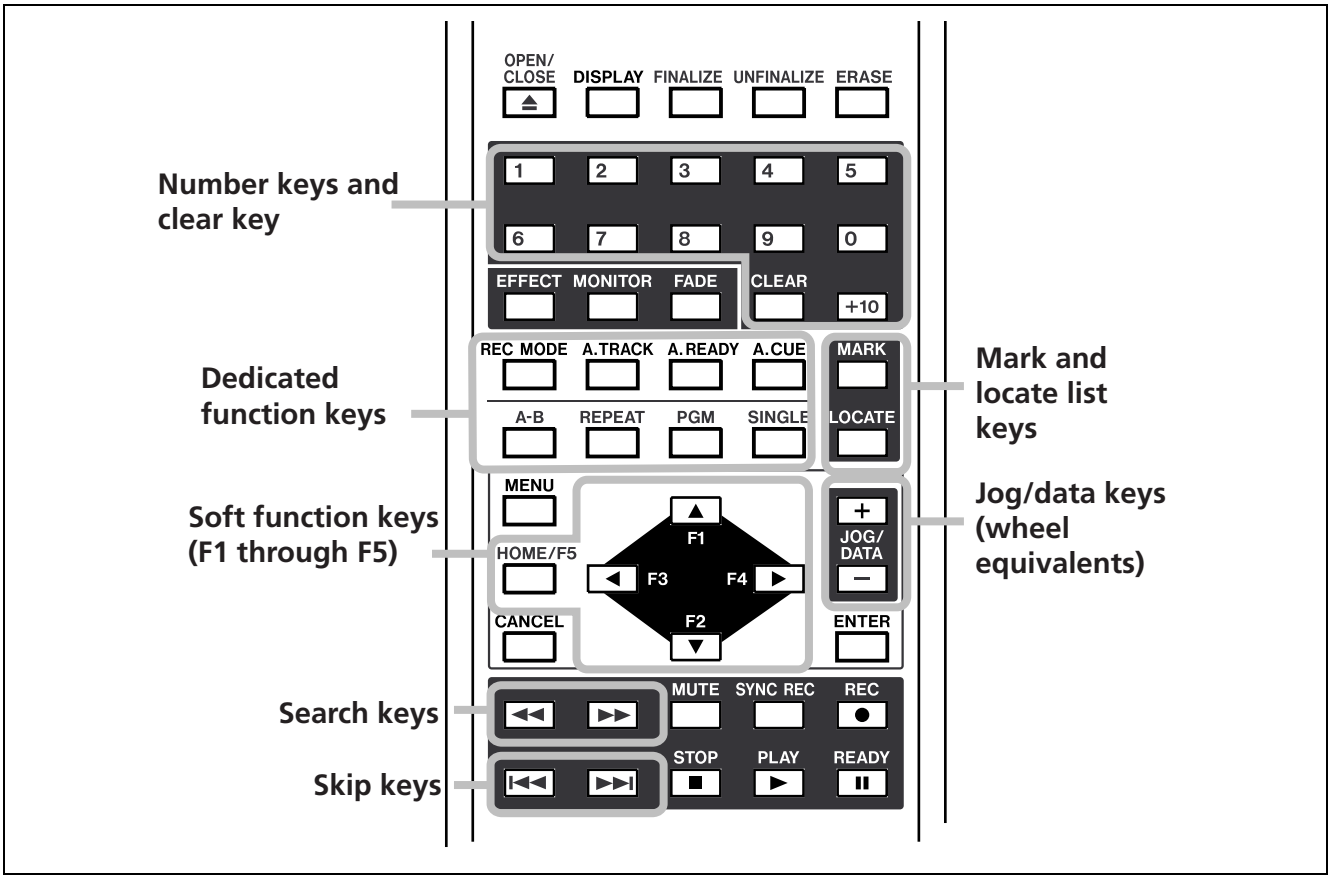


Figure 3.10: Chief features of the RC-RA1000

Note the following major differences between operations with the remote control unit and those with the main unit:

Skip (between tracks) and search (within tracks) keys These are separate keys on the remote control unit, but are the same key (short press for skip, long for search—see "Moving playback position within a disc" on page 23) on the main unit.

Number keys Present on the remote control unit, but not on the main unit. Used for direct track selection, programmed playback etc. There is also a **CLEAR** key to clear the current numerical entry.

Dedicated function keys These keys: **REC MODE**, **A.TRACK**, **A.READY**, **A.CUE**, **A-B**, **REPEAT**, **PGM**, **SINGLE** are dedicated keys on the remote control unit, but only accessible through the Virtual Front Panel (see "The virtual front panel (VFP)" on page 17) on the main unit.

Note that A-B repeat can *only* be set using the remote control unit.

MARK and LOCATE keys The **MARK** key is used to set a mark point for further location.

The **LOCATE** key is used to bring up the locate point list for location and editing.

Soft F-keys These are arranged as cursor keys on the remote control unit, echoing one of their most common functions.

JOG/DATA keys On the remote control unit, these take the place of the wheel on the main unit.

Timer start

The front panel switch beside the transport keys allows the DV-RA1000 to start playback of the loaded disc automatically when power is supplied.

Set the switch to the **PLAY** position to start playback, either from the start of the disc, or from the last position if resume playback is selected (see "Resume playback" on page 19).

Selecting the input source

The input source for recording can be selected as described here:

1 **Press the MENU key, and use the wheel to select** SYSTEM SETUP**. Press ENTER.**

2 **Use the wheel to select** INPUT SELECT**. Press ENTER.**

3 **Use the wheel to select from the following screen:**

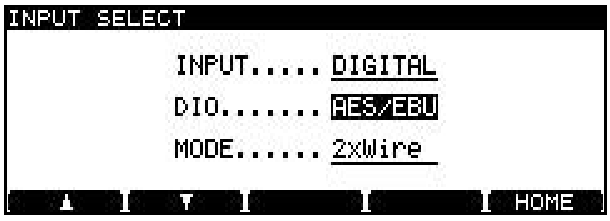


Figure 3.11: Selecting the input source

4 **First, choose between** ANALOG **and** DIGITAL **on the** INPUT **parameter.**

If you choose the analog option, remember that both the balanced XLR inputs and the unbalanced RCA inputs are active together, but you should only use one set.

5 **If you are recording to CD, or to a single- or dual-sampling frequency PCM DVD, select the** DIO **parameter (digital I/O) as either** AES/EBU **or** COAXIAL **(S/PDIF). The appropriate digital terminals will also be used for output of the digital signal.**

If you are recording to a quad-frequency DVD, this option is not available, and AES/EBU **is the only option available.**

If you are recording to a DSD DVD, the signals will always be input and output through the BNC connectors. The DIO **parameter here chooses the format in which the audio is sent and received:** DSD-RAW**, which is the raw DSD bit stream, or** SDIF-3 **(no other options are available). Consult the documentation for your other equipment to find out what format is most suitable for your setup.**

6 **Finally, in the case of double-frequency DVD with** AES/EBU **selected as the input/output connector, there is an option to select double-wire or double-speed as the I/O format** (MODE)**.**

The COAXIAL **option allows double-speed mode only, and quad-frequency is double-speed + double-wire mode, and cannot be changed.**

7 **Press ENTER to confirm your settings and return to the** SYSTEM SETUP **menu.**

	CD-R	Single-frequency DVD (44.1 / 48)	Dual-frequency DVD (88.2 / 96)	Quad-frequency DVD (176.4 / 192)	DSD DVD
DIO	COAXIAL / AES/EBU	COAXIAL / AES/EBU	COAXIAL / AES/EBU	AES/EBU only	SDIF-3 or RAW DSD
MODE	n/a	n/a	COAXIAL – double-speed only AES/EBU – double-wire or double-speed	Double-speed + double-wire only	n/a

Table 3.12: Digital input source options

The selected input is shown on the home display.

Adjusting the input level

The input level is adjustable for all inputs (analog or digital), regardless of the current selection.

The balance between the left and right channels of the input may also be set.

For optimum sonic quality, it is also possible to bypass the input level and balance circuitry.

1 **Press the INPUT LEVEL key to bring up the input level screen:**

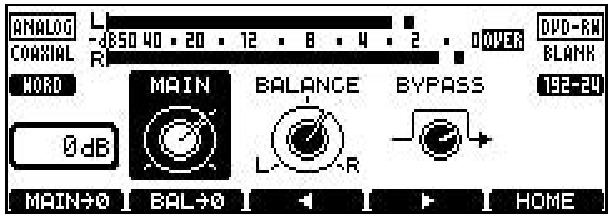


Figure 3.13: Input level settings

2 **Use the F3 and F4 keys to move between the** MAIN **(input level),** BALANCE **(between left and right) and** BYBASS **sections of the display.**

Use the wheel to adjust the settings, including the bypass setting.

TIP

Use the **F1** *key to reset the input level to unity gain, and the* **F2** *key to center the balance setting.*

3 **Press ENTER when finished.**

A note on metering

Since there is some ambiguity between makers of digital audio equipment on exactly what constitutes an OVER reading, it is important to recognize the meaning of an OVER reading on the DV-RA1000.

NOTE

When the signal on playback or recording is at 0dBFS or over for more than one sample, the OVER indicator on the meter lights. If a track is normalized to 0dB on a DAW before recording at unity gain on the DV-RA1000, the OVER indicators may therefore light, even though there is no clipping taking place.

Selecting the reference clock

As mentioned earlier, only one clock sync source should be available within a system.

The current clock selection is always shown on the home display.

To select the clock source for the DV-RA1000:

1 **Press the MENU key, and use the wheel to select** SYSTEM SETUP**. Press ENTER.**

2 **Use the wheel to select** REFERENCE CLOCK**. Press ENTER.**

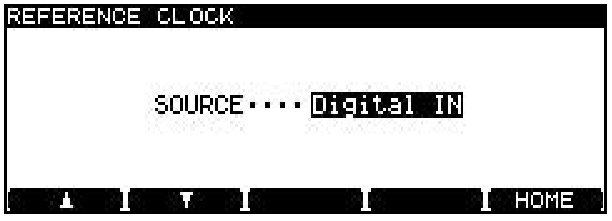


Figure 3.14: Word sync selection

3 **Use the wheel to select the clock source** (SOURCE)**:**

- Internal**—the DV-RA1000 acts as the clock master.**
- Word**—the clock sync is received from the BNC WORD SYNC IN connector.**
- Digital IN**—the clock is received from the currently selected digital audio input source.**

NOTE

This last option is not valid if a DSD disc is being recorded or played back.

4 **Press ENTER to confirm the setting and return to the** SYSTEM SETUP **menu.**

Basically, the DV-RA1000 works in the normal way as a CD player and in a very similar way to many CD recorder.

However, there are a number of features that may not be immediately obvious.

Playback

The following apply when the DV-RA1000 is used to play back CD, CD-R or CD-RW discs. Many of these features also apply to playback of DVD+RW discs recorded on the DV-RA1000.

Display

Use the **DISPLAY** key on either the main unit or the RC-RA1000 remote control unit to cycle through track elapsed time, track remaining time, total elapsed time, and total remaining time (on playback).

While recording, track elapsed time and recording remaining time are the only options available.

In stopped mode, the choices are track elapsed time, track remaining time, total time, total remaining time (and recording remaining time on recordable discs).

Moving playback position within a disc

The track skip keys on the main unit (⏮ and ⏭) also act as 10x search keys (◄◄ and ►►) within a track when pushed and held.

On the remote control unit, these functions are separated as different keys.

NOTE

This feature can also be used with DVD playback.

Programmed playback

To program the order of track playback, use the program list accessible from the Virtual Front Panel (see "The virtual front panel (VFP)" on page 17). The **PGM** key on the remote control unit can also be used to access this screen and turn programmed playback on and off.

The order of programmed playback is not stored when power is turned off.

When programmed playback is turned on, the screen shows a list of tracks which can be edited as follows:

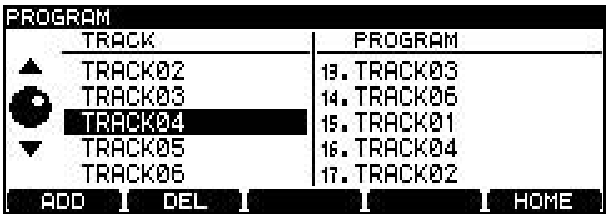


Figure 4.1: Programmed playback

- **Use the wheel to scroll through the list of tracks at the left of the screen.**
- **Add tracks to the end of the program list using the F1 (ADD) key.**
- **Delete the last track in the program list using the F2 (DEL) key.**
- **Confirm the playback order and return to the previous screen using the ENTER key (if this screen was entered using the RC-RA1000, the home screen is shown).**
- **You can also use the remote control unit key equivalents to perform these operations as well as the number keys for direct programming.**
- **Return to the virtual front panel using the CANCEL key (if you entered the screen from using the RC-RA1000, it will return you to the previous screen).**
- **When the programmed playback mode is on, a short press from the virtual front panel or from the PGM key on the RC-RA1000 turns programmed playback off. A long press enters this program screen.**

NOTE

This feature can also be used with DVD playback.

Repeat playback

Use the Virtual Front Panel (see "The virtual front panel (VFP)" on page 17) RPT function to change between single-track and whole disc repeat (and off).

The remote control unit's **REPEAT** key also allows these choices, but the RC-RA1000 also adds an A-B repeat loop.

A-B repeat Use the **A-B** key on the remote control unit to set the A and B points. the first press sets the A point, the next press sets the B point, and a third press cancels the loop.

NOTE

This feature can also be used with DVD playback.

Jog playback

You can use the wheel to jog the playback position backwards and forwards.

- **Press and hold the READY key and press the PLAY key.**

  Both keys flash. You can now use the wheel to move the play position back and forwards through the current track/file.

  Press the READY key alone to exit from the jog mode, and leave the playback position at the position selected with the wheel.

- **You can also use the JOG/DATA keys on the RC-RA1000 remote control unit as jog keys.**

NOTE

This feature can also be used with DVD playback, but not in DSD mode.

Pitch change

This is another VFP function (see "The virtual front panel (VFP)" on page 17) for playback only.

The reference clock must be set to the internal clock for this feature to operate.

Move the cursor to the PITCH on-screen button and press **ENTER** briefly to turn on pitch change.

Press and hold **ENTER** for about a second to enter the pitch change setting screen:

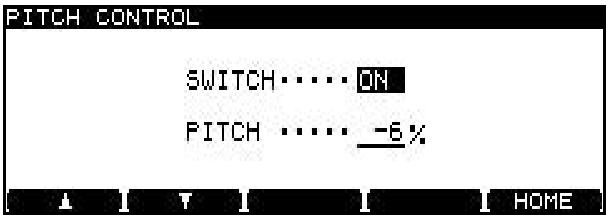


Figure 4.2: Pitch control

Use the **F1** and **F2** keys to navigate, and the wheel to set the value of the pitch (and speed) up to ±6% away from nominal.

Press **ENTER** to make the setting.

Note that the digital I/O can function at ±6% of nominal, but cannot function outside this range.

NOTE

This feature can also be used with DVD playback.

Auto cue

This allows the playback position to be cued to the first point in a track (or file) where the audio rises above the threshold level.

This feature can be used together with the auto ready function ("Auto ready" on page 25).

NOTE

Note that this function is not available on DVDs recorded in DSD mode.

Use the Virtual Front Panel (see "The virtual front panel (VFP)" on page 17) ACUE function or the remote control unit's **A.CUE** key to turn this function on or off.

NOTE

This feature can also be used with DVD playback, but not in DSD mode.

Setting the threshold level

The threshold level used for synchronized recording (“Synchronized recording” on page 28) and also for the auto cue function (“Auto cue” on page 24 above) is set by pressing and holding the **SYNC REC** key for about a second. The SOUND LEVEL screen appears:

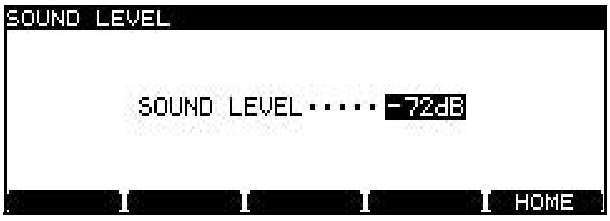


Figure 4.3: Setting the threshold level

Use the wheel to set the value of this parameter to one of the following values:

–72dB, –66dB, –60dB, –54dB, –48dB, –42dB, –36dB, –30dB, –24 dB or DD (digital detect, equivalent to –54dB).

Use **ENTER** to confirm the setting.

NOTE

In DSD mode, the –72dB and –66dB settings are not available.

Auto ready

This automatically cues up the playback position to the start of the next track after a track has been played and puts the DV-RA1000 into the ready position (the **READY** key lights).

Note that pressing **STOP** part of the way through a track when auto ready is turned on returns the playback position to the start of the current track, and the **READY** key lights (pressing **READY** part of the way through a track pauses playback at that point).

It can be combined with the Auto cue function (described in “Auto cue” on page 24) to position the playback at the start of the recorded material.

NOTE

This feature can also be used with DVD playback.

Recording

The following functions are available when recording to CD-R or CD-RW. Many are also available when recording to DVD.

MUTE key

The latching **MUTE** key, when active, cuts off the signal from the selected input to the recording. This is a “smart” key (short presses are latching, long presses are non-latching), and lights when active.

It also works in playback mode, cutting the monitored sound.

It is possible to turn the **MUTE** on and off at any time, including during recording.

Auto track increment

When recording, this allows the automatic division of the recorded material into separate tracks when the following conditions occur (this also applies to non-DSD DVD+RW recording):

Coaxial input The PQ code (digital signals from CD, MD and DAT only) is used to determine the track divisions. In cases where other coaxial digital audio sources are used, the threshold level determines track divisions, as explained below.

AES/EBU and analog inputs The threshold level (see "Setting the threshold level" on page 25) is used to divide tracks. A new track is started when the level rises above the threshold level after having fallen below that level for the previous four seconds.

TIP

It is also possible to divide a recording into tracks manually, by pressing the **RECORD** *key during recording. On a CD, two seconds of silence automatically follow such a track division (no audio data is lost—the input signal is buffered before being written to the disc). Note that tracks produced in this way must conform to the Red Book standard (be more than four seconds long) and there can be a maximum of 99 tracks on a disc.*

Fades

It is possible to create linear fades in and out when recording or playing back.

Press the **FADE** key briefly to cycle auto fading on or off or in rehearsal (the indicator shows the status, with flashing indicating rehearsal).

In rehearsal mode, no recording actually takes place, but the effects of the fade can be previewed and the fade times can be set (in playback mode, there is no difference between rehearsal and the "real thing").

Use the **F1** and **F2** cursor keys and the wheel to set these values (between 0 seconds and 24 seconds).

Fade times are set independently for fade-in and fade-out operations.

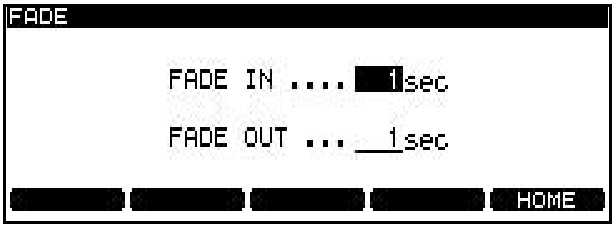


Figure 4.4: Setting fade times

The fade time setting screen can also be accessed with a long push of the **FADE** key.

Press **ENTER** to confirm the fade time settings.

- **When recording starts and fade mode is selected, the RECORD key flashes while the fade in is taking place. It lights steadily when the fade is complete.**

  When playback starts and fade mode is selected, a fade-in starts.

- **When recording stops and fade mode is selected, the fade continues for the set time, and then recording stops. If STOP is pressed during the fade out, recording then stops immediately.**

  When playback stops (with the STOP key) and fade mode is selected, the fade-out starts. If the STOP key is pressed during the fade, playback stops immediately.

NOTE

This feature can also be used with DVD recording.

Monitoring

While not recording, it is possible to switch between monitoring the input signal (the **MONITOR** indicator is on) and the playback of the disc.

Use the **MONITOR** key on the main unit or the RC-RA1000 to switch this function on (as shown by the indicator lighting).

Note that this function is automatically turned on (i.e. monitoring the input) when recording.

Also note that the VFP MONO function ("MONO" on page 17) can be used to turn monaural monitoring on and off (but this does not work in DSD mode).

NOTE

This feature also works with DVD recording.

Oscillator

The oscillator is available from the virtual front panel (“The virtual front panel (VFP)” on page 17).

Pressing the on-screen OSC button (use **F5** (PUSH)) briefly turns the oscillator on or off (nominal level).

Pressing and holding the on-screen button brings up the oscillator setting screen:

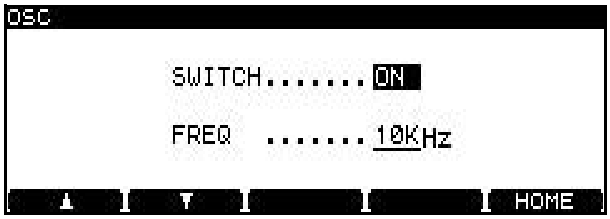


Figure 4.5: Oscillator screen

Use the **F1** and **F2** keys to navigate, and the wheel to change the **SWITCH** parameter between ON and OFF.

Change the frequency (FREQ) between 440Hz, 1kHz and 10kHz.

NOTE

This feature can also be used with DVD recording but not in DSD recording mode.

Dithering

Only available when recording CDs, use of the noise shaped dithering option may help signal-to-noise ratio when recording from digital 24-bit sources to a 16-bit CD.

There are no options—simply turn the function on or off using the virtual front panel (“The virtual front panel (VFP)” on page 17).

Copy protection

This digital copy protection (SCMS) is only available when recording CDs (not DVDs).

The SYSTEM SETUP menu COPY ID allows three choices:

- FREE–(free) no copy prohibit is enabled. Digital copying from the disc is possible.
- PROHIBIT–(prohibited) copy prohibit is enabled. No digital copying is possible.
- 1GENERATION–(single generation) “Children” may be digitally copied from the disc, but no “grandchildren” may be produced from these children.

None of these settings applies to analog copies made from the disc, of course.

Press **ENTER** to confirm this setting.

The setting may be changed on a track-by-track basis.

Finalizing discs

When recording has taken place on a CD-R or CD-RW disk, the TOC must be written to allow the disc to be played on ordinary CD players.

Press the on-screen FINALIZE button in the Virtual Front Panel (see “The virtual front panel (VFP)” on page 17) to bring up a pop-up message.

Press **ENTER** to finalize the disc, or **CANCEL** to return to the VFP.

The screen shows an appropriate message while finalization is taking place (about a minute). No cancellation is possible until the finalization is complete.

NOTE

This function may also be accessed through the dedicated **FINALIZE** *key on the RC-RA1000.*

Unfinalizing discs

This is the opposite of finalizing—removing the TOC to allow more tracks to be added (subject to the space available on the disc).

This is only possible with CD-RW discs, of course.

To unfinalize a disc, press the on-screen UNFINAL button in the Virtual Front Panel (see "The virtual front panel (VFP)" on page 17) to bring up a pop-up message.

Press **ENTER** to unfinalize the disc, or **CANCEL** to return to the VFP.

The screen shows an appropriate message while the disc is being unfinalized (about a minute).

NOTE

This function may also be accessed through the dedicated **UNFINALIZE** *key on the RC-RA1000.*

Erasing discs (CD-RW)

CD-RW discs can be erased and reused using the erase function available from the VFP.

To erase a disc, press the on-screen ERASE button in the Virtual Front Panel (see "The virtual front panel (VFP)" on page 17) to select either a full erase of the disk (Full Erase) or a faster erase (Fast Erase) process and bring up a pop-up message.

Press **ENTER** to erase the disc, or **CANCEL** to return to the VFP.

NOTE

This function may also be accessed through the dedicated **ERASE** *key on the RC-RA1000.*

Synchronized recording

Synchronized recording allows the starting of recording when the level goes above a set level or when digital input is received.

This level is set using the **SYNC REC** key ("Setting the threshold level" on page 25).

Repeated short presses of the **SYNC REC** key cycle the function through off, rehearsal mode (indicator is flashing), and active (indicator is lit).

Recording starts and stops under the following conditions:

- When a CD, DAT or MD is the digital recording source, when the signal exceeds the threshold level, recording starts.
- If DD is selected and digital recording takes place through the **COAXIAL** connectors, recording starts when a start ID is detected from DAT, or when the appropriate PQ code is detected from CD or MD players. When recording from an analog source, this is equivalent to a level setting of –54dB.
- If the source is analog, recording starts if one second or more of "below-threshold" signal is received, followed by a signal above the threshold. If the sound immediately starts at a loud level, recording will not start.
- Recording stops when the signal drops below the threshold level for more than five seconds or (in the case of recording from a digital source) when a digital track stop signal is received.

Rehearsed synchronized recording

When the **SYNC REC** indicator is flashing, synchronized recording can be rehearsed.

This allows "false starts", etc. to be eliminated, as the time that recording starts can be slipped up to 1.7 seconds (in 0.01 second increments) relative to the time that input signal goes over the trigger threshold level.

To use this feature:

1. **Press SYNC REC so that the indicator is flashing (rehearsal mode).**
2. **Press the RECORD key, and then the PLAY key so that the RECORD key flashes.**

3 **Start the source. The first four seconds of the synchronized source after the threshold level is exceeded are recorded to a buffer memory and looped. The screen shows the rehearsal screen (**REHEARSAL**):**

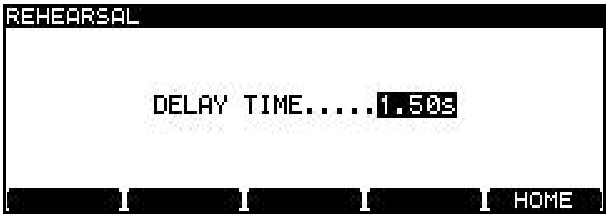


Figure 4.6: Rehearsing synchronized recording

4 **Use the wheel to delay the record start time (0 seconds. Press ENTER when done (CANCEL cancels the setting) to return to the home screen.**

5 **The unit is now in REC READY mode.**

Making the recording

1 **When the start point has been delayed to the point you want, press SYNC REC again so that the indicator lights steadily.**

2 **Line up the source to a little before the track starts.**

3 **Start playback of the source—recording starts when the threshold is exceeded (plus any delay added as above).**

About marks

A maximum of 99 marks can be added to a disc (CD) or to a project (DVD) to help with location, etc. These marks can be named and edited.

NOTE

Although marks can be added to a CD recording project (or to a pre-recorded CD), they are not stored when the CD is ejected. They become part of the project on a DVD.

- **Press the MARK key to add a mark at the point where the key was pressed. A popup message appears for a second to let you know the mark has been set.**
- **Marks can be added when stopped, paused, playing back or recording.**
- **Pressing and holding the DISPLAY key and then pressing the MARK key brings up the locate list screen.**
- **Use the wheel to scroll through the list. Marks are displayed in the order they appear in the play list (DVD). If the play list order changes, so does the mark list order.**

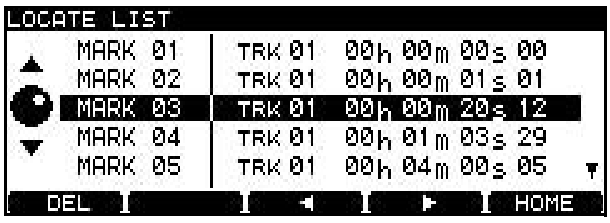

LOCATE LIST
MARK 01 TRK 01 00h 00m 00s 00
MARK 02 TRK 01 00h 00m 01s 01
MARK 03 TRK 01 00h 00m 20s 12
MARK 04 TRK 01 00h 01m 03s 29
MARK 05 TRK 01 00h 04m 00s 05
DEL
HOME

Figure 4.7: The locate list

NOTE

The **MARK** *key on the RC-RA1000 remote control unit can be used to enter marks, and the* **LOCATE** *key can be used to bring up the locate list.*

Jumping to a mark

- **To jump to a location mark, use the wheel to highlight it in the list, and press ENTER.**

Editing marks

- **From the locate list, use F3 and F4 to start editing the currently-highlighted mark.**

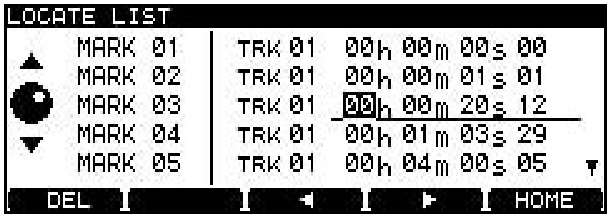

LOCATE LIST
MARK 01 TRK 01 00h 00m 00s 00
MARK 02 TRK 01 00h 00m 01s 01
MARK 03 TRK 01 00h 00m 20s 12
MARK 04 TRK 01 00h 01m 03s 29
MARK 05 TRK 01 00h 04m 00s 05
DEL
HOME

Figure 4.8: Editing a mark

- **Use the cursor keys to highlight the time fields and the wheel to edit these fields, to slip the position of the mark.**
- **Press ENTER when the editing is complete. The mark is then highlighted, and you can use it for location.**
- **Use F1 (DEL) to delete the highlighted mark from the list.**

CAUTION

If you do not write the UDFMI information to disc, the marks will not be saved. See "Important note on the file system" on page 31.

When performing high-resolution recording using DVD media with the DV-RA1000, it is important to remember that you are not recording a standard audio disc.

The recording process creates an archive of audio files which can be edited and played back using a DV-RA1000. They can be subsequently retrieved or transferred to another unit such as a digital audio workstation for later processing and pre-mastering.

NOTE

The DV-RA1000 uses DVD+RW media for high-resolution recording. You cannot use DVD-R, DVD-RW or DVD-RAM media with the DV-RA1000.

Organization of projects and files

On the DV-RA1000, a *project* consists of up to 99 audio files—the same number as the maximum number of tracks on a Red Book CD-DA.

In a project, all the files must be the same sampling frequency (or all in DSD format). This is determined when the project is set up.

You can have different projects on the same disc (up to 99 of them, in fact), and different projects can have different sampling frequencies and word lengths.

As well as the audio files, a project also contains the following information:

- The setup for the effects
- Mark data
- Text associated with the project other than the file names
- A playlist showing the running order
- User settings for the DV-RA1000

Important note on the file system

In order for the DV-RA1000 to read the information on a disc, control information referred as UDFMI (UDF Management Information) must be written to the disc.

Although the DV-RA1000 writes this control information at key events, such as when the disc is ejected, or the unit is shut down (see "Shut down" on page 32), unexpected power loss may cause a disc to appear unreadable.

To write the UDFMI manually:

1 **From the stopped state, press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** DISC **sub-menu.**

2 **Highlight the** SAVE UDFMI **item and press ENTER.**

3 **A popup asks you if you are sure. Press ENTER to continue, and a progress bar shows the progress of the operation.**

Press CANCEL to cancel the operation.

TIP

This SAVE UDFMI function is also installed by default as a short cut using function key **F5** *(see "Short cuts" on page 18).*

CAUTION

There is a limit to the number of times that DVD+RW media used by the DV-RA1000 can be written. This also applies to the UDFMI. It is impossible to provide definite guidelines on the number of times this is possible, but the type of media, environmental factors, etc. introduce an element of unpredictability. We therefore recommend that wherever possible, you use new media for important recording projects, to prevent the possibility of data loss caused by media errors.

Shut down

In order to shut down the DV-RA1000 safely with a disc loaded, and writing all the UDFMI data safely to disc (you cannot do this while playing back or recording a disc):

1 **With a disc loaded, press and hold the OPEN/CLOSE (SHUT DOWN) key for at least a second.**

2 **A popup menu appears. Press ENTER to write the UDFMI, or CANCEL to return (if you pressed the OPEN/CLOSE key accidentally for a long time, for example).**

3 **The DISC indicator flashes while the UDFMI is being written. All front panel controls are disabled. When it lights steadily, a popup message appears telling you that you can turn off the DV-RA1000 using the POWER switch.**

Recording times and track lengths

The total time recordable on a DVD+RW single-layer disc depends on the sampling frequency.

In addition, the maximum file size is fixed at 2GB. This means that the maximum recording time per track also varies according to the sampling frequency.

All audio files must be at least four seconds in length.

Sampling frequency	Recording type	Disc time (minutes)	Maximum track length (minutes)
44.1kHz	PCM	290	135
48kHz	PCM	266	124
88.2kHz	PCM	144	67
96kHz	PCM	133	62
176.4kHz	PCM	70	33
192kHz	PCM	66	30
2.8225MHz	DSD	107	50

Table 5.1: Sampling frequencies and recording times

Starting a new disc

When you insert a new DVD+RW disc into the tray and close it, the screen immediately shows the new project screen:

Figure 5.2: New project

1 **Give the project a name. Press the F4 key to start editing the name.**

Use the naming functions described in "Naming files, projects, marks, etc." on page 14. Press ENTER when done.

TIP

A PS/2 keyboard connected to the DV-RA1000 makes titling projects and files much easier. We strongly suggest that you use this facility.

2 **Move to the** Mode **field. Use the wheel to select the sampling frequency. Alternatively, select** DSD **as the format (the DSD indicator by the disc tray will light when a DSD project is in use, otherwise the PCM indicator lights).**

3 **When you press ENTER to confirm the sampling frequency, the DV-RA1000 starts to create the project and to perform a background format of the disc.**

While the background format is taking place, various functions, such as ejecting the disc and shutting down the unit are possible.

CAUTION

We do not recommend that recording is carried out while the background format is carried out, to avoid the possibility of attempting recording on an unformatted part of the disc.

We strongly recommend that you use discs exclusively with the DV-RA1000 and do not use discs which have been used on a computer, or for any other purpose.

Adding a new project

As a disc can contain more than one project, you can also use the menu system to create a project on a disc that has already been formatted, and contains a project.

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** PROJECT **sub-menu.**

2 **Highlight** CREATE **and press ENTER.**

This brings up the screen allowing you to enter the name and properties of a project, as described in the previous section.

Adding notes to a project

Add notes on artists, recording details, etc. to a project. Unlike a written disc insert or tape label, these notes will always stay with the disc! You can enter up to 1000 characters for session notes, etc.

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** PROJECT **sub-menu.**

2 **Highlight the** PROJECT TEXT **sub-menu and press ENTER.**

Figure 5.3: Adding notes to a project

3 **Use the soft keys and wheel (or an attached PS/2 keyboard) to enter the text ("The DV-RA1000 has two types of "home screen", depending on whether a CD or DVD disc is being used." on page 14). You can add more lines to the notes than you can see on screen and scroll up and down to view them.**

4 **Press and hold ENTER for a second or so, to store the project text (brief presses of ENTER add a carriage return). Press and hold CANCEL to exit without saving (brief presses of CANCEL act as a delete key).**

NOTE

Remember that this text will not be stored on disc until you write the UDFMI (see "Important note on the file system" on page 31).

Changing the current project

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** PROJECT **sub-menu.**

2 **Highlight the** OPEN **sub-menu to show a list of the names of all projects on the disc, together with their sampling frequencies.**

The current project is shown with an arrow beside the name.

Figure 5.4: Loading a project

3 **Use the wheel to move the cursor to the project to be loaded, and press ENTER. The selected project is then loaded (the sampling frequency is automatically changed).**

Changing the name of a project

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** PROJECT **sub-menu.**

2 **Highlight the** OPEN **sub-menu to show a list of the names of all projects on the disc, together with their sampling frequencies (see Figure 5.4, *Loading a project*).**

The current project is shown with an arrow beside the name.

3 **Use the wheel to move the cursor to the project to be renamed, and press either the F3 or F4 key.**

You can then edit the name of the project as explained in "The DV-RA1000 has two types of "home screen", depending on whether a CD or DVD disc is being used." on page 14.

4 **Press ENTER when done.**

Deleting a project from disc

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** PROJECT **sub-menu.**

2 **Highlight the** OPEN **sub-menu to show a list of the names of all projects on the disc, together with their sampling frequencies.**

The current project is shown with an arrow beside the name (see Figure 5.4, *Loading a project*).

3 **Press the F1** (ERASE) **key to delete the highlighted project. You are asked to confirm the deletion. Press ENTER to delete, or CANCEL to cancel the operation.**

All files in the project will be deleted along with the project itself.

Formatting a disc

When a disc that has already been used is formatted, a new project is automatically added to the disc. Reformatting a DVD+RW disc on the DV-RA1000 will never result in an entirely blank disc (but of course, all previous data is removed during a format process).

CAUTION

If you attempt recording many times to the same DVD+RW disc and erasing or formatting it often, you may find that it does not record properly. You should use a new disc for any really important recordings.

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** DISC **sub-menu.**

2 **From this sub-menu, select** FORMAT**.**

3 **Enter a name and sampling frequency for the first project to be created on the newly-formatted disc (see "Adding a new project" on page 33).**

4 **Press ENTER to start the formatting process. This will take a few minutes, and the unit is not usable while the format takes place.**

NOTE

You cannot use DVD+RW discs which have been formatted on a computer for recording with the DV-RA1000.

Recording files to disc

Once a project has been set up, audio files can be recorded at the sampling frequency and word length specified by the project.

1 **Press the RECORD key. While the disc and drive are being "lined up" for recording, the READY indicator flashes, and the DISC indicator also flashes.**

2 **When the READY indicator is lit, press PLAY to start recording.**

3 **The DISC indicator flashes while writing is taking place.**

While recording, the display shows either the elapsed time of the track, or the remaining time on the disc (change this with the DISPLAY key). Note that if the recording mode is set to

Assemble, the elapsed time of the assembled track is shown.

TIP

In the same way as when the DV-RA1000 is recording CDs, pressing **RECORD** *while recording will create a track division (but not in DSD recording). Also, to create several tracks from one recording (for example, when making a live recording), you can use the file divide function (see "Dividing files" on page 37).*

4 Press STOP to finish recording.

CAUTION

The **DISC** *indicator continues to flash for a few seconds after recording has finished. Do not cut off the power to the DV-RA1000 while the indicator is flashing, or the recording may be corrupted.*

Recording mode

It is possible to assemble a single track from a number of recording sessions. In other words, stopping recording and restarting does not automatically increment a new track.

NOTE

This function is only available with DVDs recorded in PCM mode.

This function is called the "recording mode" and it is available from the virtual front panel (see "The virtual front panel (VFP)" on page 17), as well as from the dedicated **REC MODE** key on the RC-RA1000 remote control unit.

Normal (or N on the virtual front panel) means that stopping and restarting recording will add a new file to the disc.

Assemble (or A on the virtual front panel) means that recordings will be "assembled". If the playback position when record ready is entered is at the end of a track, the new material will be added to the end of that track. Note that the original track does not have to be the last track recorded in the project.

If the playback position when recording starts in assemble mode is part of the way through a track, the original track from that position to the end of the track will be replaced by the new material.

Playing back files

Use the DV-RA1000 in much the same way as a CD player when playing back the files recorded on DVD.

Repeat functions, etc. will work as with CDs.

Play lists

A play list is a list in which files are assigned to tracks on a DVD disc. Unlike a programmed playback list (see "Programmed playback" on page 23), each file in a play list must appear once (and only once).

TIP

Only one play list per project can be created, but it is possible to program a play list so that the tracks are played in a different order or tracks are missed out, etc.

Play lists are created from the files present in a project in the following way:

1 Press MENU and use the wheel and ENTER to select the DVD **menu. From there, select the** EDIT **sub-menu.**

2 From this sub-menu, select PLAYLIST**.**

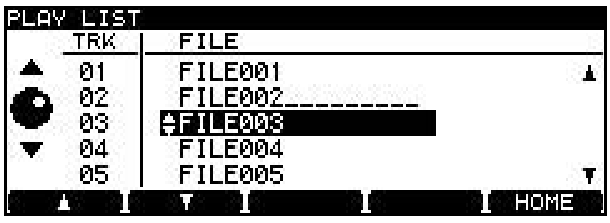


Figure 5.5: Editing a play list

3 Use the wheel to highlight a file.

4 Use the F1 (up) and F2 (down) keys to move the highlighted file up and down in the play list order.

5 Press ENTER when done.

Setting marks

As when recording CDs, you can use this facility to set location marks which can then be used for location purposes (see "Editing files" on page 36).

However, when recording to DVD, these marks are written to UDFMI as part of the project.

Erasing a file

You can erase the current file in the following way:

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** EDIT **sub-menu.**

2 **From this sub-menu, select** ERASE**. A popup message appears.**

3 **Press ENTER to erase the file, CANCEL to cancel the action.**

Renaming a file

When the DV-RA1000 records files, it numbers them in sequence, starting at 0, which is probably not very useful in the future.

To rename files, and provide them with meaningful titles for future reference:

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** EDIT **sub-menu.**

2 **From this sub-menu, select** RENAME**. Press ENTER.**

Figure 5.6: Editing file names

3 **Use the wheel to highlight a file, and press the F3 or F4 key to start editing.**

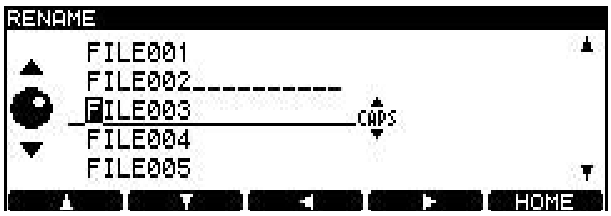


Figure 5.7: Editing file names (ii)

4 **Edit the file name as described in "The DV-RA1000 has two types of "home screen", depending on whether a CD or DVD disc is being used." on page 14.**

5 **Press ENTER when done.**

Editing files

CAUTION

These editing operations are destructive, but there is one level of undo available which applies to the operations in the EDIT *menu.*

Combining files

If two recordings have been made in the same project which are to form one track, the files can be joined together.

The current file is joined to the file following it in the play list (so if two files are to be joined and they are not next to each other in the play list, the play list must be edited ("Play lists" on page 35).

TIP

Although this technique simply appends one file to the end of another, it is possible to remove unwanted heads and tails using the editing functions (see "Dividing files" on page 37).

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** EDIT **sub-menu.**

2 **From this sub-menu, select** COMBINE**. Press ENTER.**

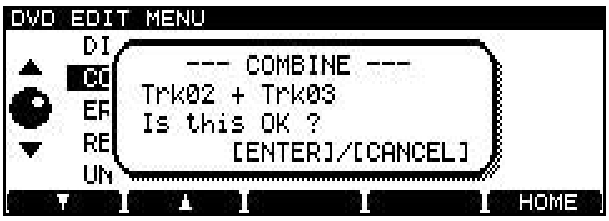


Figure 5.8: Confirming a file combine operation

3 **Press ENTER to combine the files, or CANCEL to cancel the operation.**

NOTE

The maximum size of a file is 2GB, as explained on "Recording times and track lengths" on page 32. If combining two files will create a file larger than this, a popup message alerts you to the fact, and you cannot proceed with the combine operation.

Dividing files

You can split a file into two parts at the current playback position. this may be useful if you want to divide a single long live recording into separate tracks, for example.

TIP

You may want to set a mark at the split point so that you can locate it easily.

File division always takes place on the current file. Each resulting file must be at least 4 seconds in length to be usable. If neither part resulting from the division is greater than four seconds in length, the divide operation cannot be carried out. If one resulting file is under 4 seconds in length, a popup message warns you. If you carry on with the divide operation, the short part is deleted (of course, this might be a cough or fret noise before a take which would be edited out in any case).

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** EDIT **sub-menu.**

2 **From this sub-menu, select** DIVIDE**. Press ENTER.**

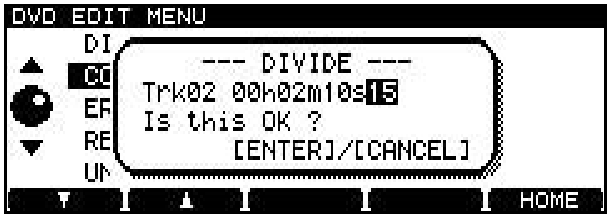


Figure 5.9: Confirming a file divide operation

The DV-RA1000 enters pause mode, and the first three seconds of the file following the division point are played back as a loop. Use the wheel to trim the division point so that the new file starts at the point you want.

3 **Press ENTER to set the division point and split the file. The second file will take the same name as the first, but the name will end with** _2**.**

Undo and redo

The last action performed in the EDIT menu can be undone (split files can be recombined and joined files can be resplit, play lists can be undone, etc.).

If an action has been undone, you can redo it.

Note that if any recording is done following an edit operation, that edit operation can no longer be undone. Likewise, if any recording is done following an undo operation, that undo operation can no longer be redone.

1 **Press MENU and use the wheel and ENTER to select the** DVD **menu. From there, select the** EDIT **sub-menu.**

2 **Highlight** UNDO/REDO **and press ENTER. A popup message appears with either** Undo **or** Redo**, followed by the name of the operation you are undoing or redoing (combine, divide, play list, etc.).**

3 **Press ENTER to undo or redo the named operation, or CANCEL to cancel the undo/redo.**

The DV-RA1000 incorporates two signal processors: a 3-band equalization stage and a dynamics processor. These can be inserted either before the final recording process (post-AD conversion) or on playback (pre-DA conversion).

These effects can be used on playback to simulate the effects of pre-mastering effect processing before the mixed stereo track is actually pre-mastered in another facility, or may be even used to perform the actual premastering.

Equalization is carried out a 40-bit resolution, and dynamics processing is carried out at 32-bit resolution at the same sampling frequency as the current project.

NOTE

The effects are not available in quad-frequency or DSD modes.

Setting up the effect position

The **EFFECT** key is used to switch the effects on and off, to set up the parameters, and to set up the position of the effect in the signal chain.

Press and release the key to turn the effect chain on and off (the indicator shows the status).

Press, hold and release the key to bring up the first setting screen:

Figure 6.1: Effect setting screen

Use the wheel to change the effect position between the playback (PLAYBACK) and recording positions (RECORD).

Use the cursor keys to navigate to the INPUT LEVEL and OUTPUT LEVEL fields, and use the wheel to set the values of these parameters (that is, the input attenuation before the signal enters the effects section and the attenuation after the signal leaves the effects section).

These levels can be set from 0dB (no attenuation) to INF (infinity, i.e. no sound), in 0.5dB steps from 0dB to –10dB and in 1dB steps thereafter.

Press **ENTER** to confirm these settings (**CANCEL** cancels them).

Equalization

The equalization effect has three bands: a shelving sweepable low, a fully parametric mid, and a shelving sweepable high.

All bands can cut or boost ±12dB. The slope of the low and high bands is 6dB/octave.

1 **From the effect setting screen (see Figure 6.1, *Effect setting screen*), press the F3 (EQ) key.**

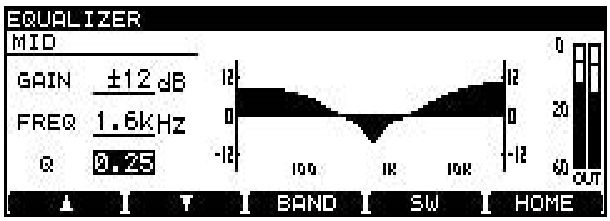


Figure 6.2: EQ setting screen

- **Pressing the F3 (BAND) key cycles between the LOW, MID and HIGH bands.**
- **Use the F1 (up) and F2 (down) keys to select the GAIN and FREQ (frequency) parameters and the Q parameter for the MID band.**
- **Use the wheel to change the values. As the values change, the response curve changes to give a visual indication of the EQ setting.**

2 **Press F4 (SW) to switch the EQ effect on and off. When the effect is turned on, the response curve is filled solid, as in the figure here (it is hollow when the effect is turned off).**

- **The output level from the EQ effect (which feeds the dynamics processor) is shown by the meters at the right of the response curve.**

NOTE

Since each band is capable of boosting the level by 12dB in the digital domain, you should take care not to overload the outputs.

3 **Press ENTER to confirm these settings.**

Dynamics processor

The dynamics processor has a number of settings available:

- Three-band compressor
- Three-band expander
- Single-band compressor
- Single-band expander

The frequencies of the two crossover points of the three-band effects can be set (the slope of the filters is 6dB/octave).

The dynamics processor always comes after the EQ effect, and immediately after the AD converter when recording, and before the DA converter on playback.

1 **From the effect setting screen (see Figure 6.1, *Effect setting screen*), press the F4 (DYN) key.**

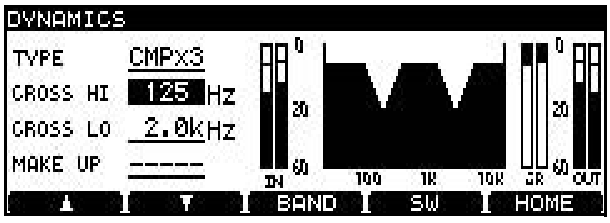


Figure 6.3: Dynamics crossover screen

2 **The first parameter, TYPE, allows you to select the type of dynamics processor, as explained above: CMPx3, EXPx3, CMPx1, EXPx1.**

3 **On this screen, use the F1 and F2 keys (up and down) and the wheel to set the crossover points for the dynamics bands (this only has an effect when CMPx3 or EXPx3 is selected). These two frequencies cannot overlap.**

If CMPx1 is selected, the MAKE UP (makeup gain) parameter can be turned ON or OFF here.

4 **Press F3 (BAND) to make the settings for the dynamics processor. For CMPx3 and EXPx3 settings, repeated presses of the F3 key cycle through LOW, MID and HIGH bands. There is only one setting screen and one set of parameters, named SINGLE, for the single-band processors.**

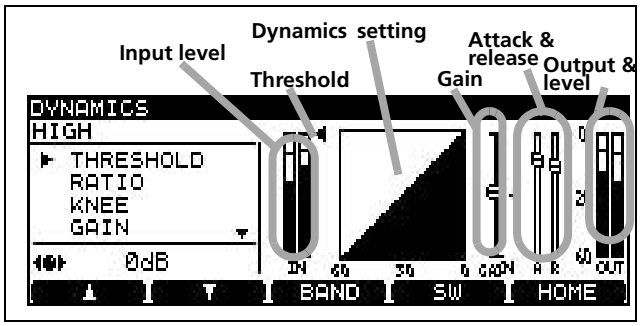


Figure 6.4: Dynamics processor band settings

5 **For each band of the processor, the following parameters are available (the screen shows the setting, and in many cases, a graphic changes to reflect the changes made to the parameter value). Use the F1 and F2 keys to navigate, and the wheel to change values.**

- THRESHOLD**:the value below nominal level at which the processor starts to operate**
- RATIO**: the ratio between the original and processed signal levels**
- KNEE**: the shape of the change between the processed and unprocessed response slopes**
- GAIN**: the overall gain of the processed signal**
- ATTACK**: the time the processor takes to reach the gain level**
- RELEASE**: the time the processor takes to return to unprocessed level, once the input falls below threshold**

6 **Use F4 (SW) to turn the dynamics processor on and off.**

7 **Press ENTER to confirm these settings.**

The DV-RA1000 will work with the following Microsoft operating systems: Windows Me, Windows 2000, and Windows XP.

It will work with the following operating systems from Apple Computer: MacOS 9.2.2 and above, and MacOS X 10.2 and above.

For all the above operating systems, no driver is required. The DV-RA1000 simply appears as a removable USB mass storage device. See "Disc types that can be used in USB mode" on page 40 for details of the discs which you can use.

However, you should note that under no circumstances can a computer write audio data to a DV-RA1000 disc that can be read by the DV-RA1000.

CAUTION

You should always follow your computer's instructions on how to disconnect a USB removable drive safely from your system. If you do not do this, there is a risk of data corruption on your computer.

Connecting the DV-RA1000 to a computer

Only use a high-quality cable certified for use with USB 2.0 systems.

NOTE

You can use the DV-RA1000 with USB 1.1 systems, but the performance will necessarily not be as good as with a USB 2.0 system.

Avoid connecting the DV-RA1000 to a computer using a USB hub. Always connect the DV-RA1000 and computer directly.

1 Press MENU and select USB**. Press ENTER.**

2 A popup menu on the DV-RA1000 screen asks you if you want to connect to the computer. Press ENTER (or CANCEL to cancel).

The DV-RA1000 appears as a mass storage unit (on some Microsoft systems, it may initially appear as an "unrecognizable device"; this will also happen if the DV-RA1000 is not in USB mode when it is connected to a PC).

All front panel controls are disabled (except the **CANCEL** key (see below). Use the computer's system to eject a disc.

Disc types that can be used in USB mode

In stand-alone mode, the DV-RA1000 can be used to record CD-R, CD-RW and DVD+RW media.

However, in USB mode, the list of media types usable is expanded.

For writing, the DV-RA1000 can use:

- CD-R
- CD-RW
- DVD+R single-layer
- DVD+R dual-layer
- DVD+RW

In addition, it can read data from the following media types:

- CD-DA
- CD-ROM
- CD-R
- CD-RW
- DVD-ROM
- DVD–R
- DVD-RW

Disconnecting from Windows 2000 / XP systems

With Windows Me, Windows 2000 and Windows XP, the procedure is a little more complex than simply unplugging the DV-RA1000.

In the system tray (typically at the bottom right of the screen), you see an icon picture of a PC card and an arrow.

1 Left-click this icon to show a popup bar. Click this popup bar to allow the DV-RA1000 to be removed from the computer.

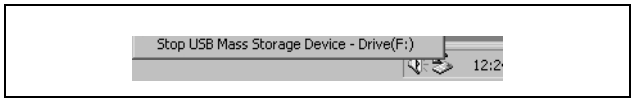


Figure 7.1: Disconnecting the DV-RA1000

2 Follow the instructions below on disconnecting ("After "ejecting" from the computer" on page 41).

Disconnecting from Mac OS X systems

When you are disconnecting the DV-RA1000 from a Macintosh system (OS 9 or OS X), drag the disk icon to the Trash, or press Command-E (OS X 10.3 also has a button in the Finder which allows ejecting removable media).

When the icon has disappeared from your desktop, you can disconnect the DV-RA1000 as described below.

After "ejecting" from the computer

When you have used the computer operating system to "eject" or disconnect the DV-RA1000 from the system:

1 **Press CANCEL to start the disconnection process.**

2 **A popup appears. Press ENTER to completely disconnect the DV-RA1000, or CANCEL to halt the disconnection process.**

3 **When the popup disappears, you can disconnect the cable from the computer.**

Using the DV-RA1000 discs in a computer

If your computer is fitted with an optical drive capable of reading DVD media, you may find that you can read files created on the DV-RA1000, depending on the drive, and on your operating system.

Note, though, that you cannot transfer audio files which can then be played back by the DV-RA1000 to the disc from a computer, either directly to the disc or via USB.

Analog I/O

Balanced inputs

Connector:	3-pin XLR female x 2 (1: GND, 2: Hot, 3: Cold)
Input impedance	> 10kΩ @ 1kHz
Nominal input level	+4dBu
Maximum input level	+20dBu, +22dBu, +24dBu (switchable)

Unbalanced inputs

Connector	Unbalanced RCA pin jacks x 2
Input impedance	> 10kΩ @ 1kHz
Nominal input level	–10dBV
Maximum input level	+6dBV

Balanced outputs

Connector	3-pin XLR male x 2 (1: GND, 2: Hot, 3: Cold)
Output impedance	220Ω
Nominal output level	+4 dBu
Maximum output level	+20dBu, +22dBu, +24dBu (switchable)

Unbalanced outputs

Connector	Unbalanced RCA pin jacks x 2
Output impedance	220Ω
Nominal output level	-10 dBV
Maximum output level	+6dBV

Phones output (stereo)

Connector	1/4 " stereo jack (T = L, R = R, S = GND) x 1
Max output power	50 mW + 50 mW (30Ω)

Digital I/O

PCM inputs (XLR)

Connector:	3-pin XLR female x 2 (1: GND, 2: Hot, 3: Cold)
Signal type	IEC-60958-4, AES-3-1992
Input frequencies (kHz)	44.1/48, 88.2/96 (double-speed or double-wire), 176.4/192 (double-speed + double-wire) all ±6%
Data format	16-bit (44.1kHz, CD-DA), 24-bit (all other PCM recording to DVD+RW media)
Input impedance	110Ω ±20%
Nominal input level	2–7Vpp
Minimum signal level	200mVpp
Intrinsic jitter	<0.025UI (4ns @ 48kHz)

PCM inputs (RCA)

Connector:	RCA (pin) jack x 1
Signal type	IEC-60958-3
Input frequencies (kHz)	44.1/48, 88.2/96 (double-speed), all ±6%
Data format	16-bit (44.1kHz, CD-DA), 24-bit (44.1kHz/48kHz, 88.2/96kHz to DVD+RW media)
Input impedance	75Ω ±20%
Nominal input level	0.5Vp-p
Minimum signal level	0.2Vp-p
Intrinsic jitter	<0.025UI (4ns @ 48kHz)

DSD inputs (BNC)

Connector	BNC connectors x 2
Signal type	Sony/Philips SDIF-3 format / DSD-Raw
Signal level	2 V to 5 V (equivalent to 5V TTL)
Input impedance	75 Ω, ±10%
Clock synchronization	Must be synchronized to 44.1 kHz at WORD SYNC IN or use internal clock at 44.1 kHz

PCM outputs (XLR)

Connector:	3-pin XLR male x 2 (1: GND, 2: Hot, 3: Cold)
Signal type	IEC-60958-4, AES-3-1992
Output frequencies (kHz)	44.1/48, 88.2/96 (double-speed or double-wire), 176.4/192 (double-speed + double-wire) all ±6%
Data format	16-bit (44.1 kHz, CD-DA), 24-bit (all other PCM recording to DVD+RW media)
Output impedance	110Ω ±20%
Nominal output level	2–5 Vpp
Intrinsic jitter	<0.025UI (4 ns @ 48 kHz)

PCM outputs (RCA)

Connector:	RCA (pin) jack x 1
Signal type	IEC60958-3
Output frequencies (kHz)	44.1/48, 88.2/96 (double-speed), all ±6%
Data format	16-bit (44.1 kHz, CD-DA), 24-bit (44.1 kHz/48 kHz, 88.2/96 kHz to DVD+RW media)
Output impedance	75Ω ±20%
Nominal output level	0.5 Vpp (typical)
Intrinsic jitter	<0.025UI (4 ns @ 48 kHz)

DSD outputs (BNC)

Connector	BNC connectors x 2
Signal type	Sony/Philips SDIF-3 format / DSD-Raw
Signal level	2 V to 5 V (equivalent to 5V TTL)
Output impedance	10 Ω
Clock synchronization	Must be synchronized to 44.1 kHz at WORD SYNC IN or use internal clock

Other connections

WORD SYNC IN

Connector	BNC
Input voltage	5 V TTL equivalent
Input impedance	75Ω ±10%, with THRU automatically engaged

WORD SYNC OUT

Connector	BNC
Input voltage	5 V TTL equivalent
Input impedance	< 10Ω
Sampling frequencies (kHz)	44.1, 48, 88.2, 96, 176.4, 192 (PCM) / 44.1 (DSD)

WORD SYNC THRU

Connector	BNC
Output voltage	5 V TTL equivalent
Output impedance	< 10Ω

USB 2.0 USB 2.0 Hi-speed Female B-type connector for connection to personal computer

CONTROL I/O (serial) connector

Connector	'D'-sub 9-pin female
Control protocol	TASCAM optical disc control protocol[a]
Communication protocol	RS-232C

REMOTE IN (from RC-RA1000)

Connector	2.5mm stereo mini-jack

KEYBOARD

Connector	Standard PS/2 mini-DIN connector
Compatibility	101-key (US) keyboard or 106-key (Japanese) PS/2 keyboard

a. Contact your TASCAM distributor for full details of how to use this connector if you wish to implement remote control.

Audio performance

These figures all measure analog-to-analog performance.

Frequency response

All modes	20 Hz — 20 kHz (±0.5dB)
at 40 kHz –1 dB (±1 dB)	Fs = 88.2/96 kHz
at 80 kHz –3 dB (+1dB/–2 dB)	Fs=176.4/192 kHz
at 50 kHz –3 dB (±1dB)	DSD mode

Total Harmonic Distortion (inputs at maximum level)

PCM	< 0.005% (f=1 kHz, AES-17LPF)
DSD	< 0.007% (f=1 kHz, AES-17LPF)
Signal-to-noise ratio	>103 dB (A-weighting, AES-17LPF, DVD+RW recording) >94 dB (A-weighting, AES-17LPF, CD-R/RW recording)
Dynamic range	>103 dB (1 kHz –60 dBFS (N+THD+60 dB), A-weighting, AES-17LPF, DVD+RW recording
Crosstalk	>97 dB, f=1 kHz, AES17-LPF, DVD+RW recording
Click noise	<0 dB = –16 dBFS
Difference between channel levels	<1.0 dB, 1 kHz, 0 dBFS

Physical, etc. specifications

Voltage requirements	Japan/USA/Canada 100–120 VAC, 50/60 Hz U.K./Europe 220–240 VAC, 50 Hz Australia 240 VAC, 50 Hz General export 120/230 VAC, 60 Hz
Power consumption	34 W
Dimensions (w x h x d)	483 x 95 x 357 (mm) 19 x 3.75 x 14.1 (in)
Weight	6.8 kg (15 lbs), excluding remote control unit
Operating temperature	5°C to 35°C (41°F to 95°F)
Supplied accessories	RC-RA1000 wired remote control unit (with 5m/15ft cord) Power cord Rack mounting kit Owner's Manual Quick Reference Guide Warranty information

Dimensional drawing

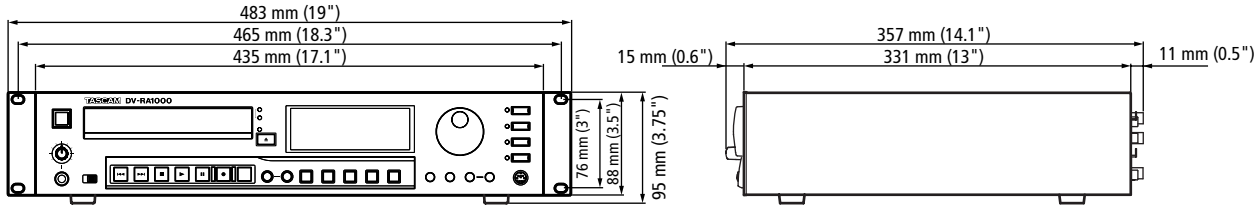


Figure 8.1: Dimensions of the DV-RA1000

Block diagram

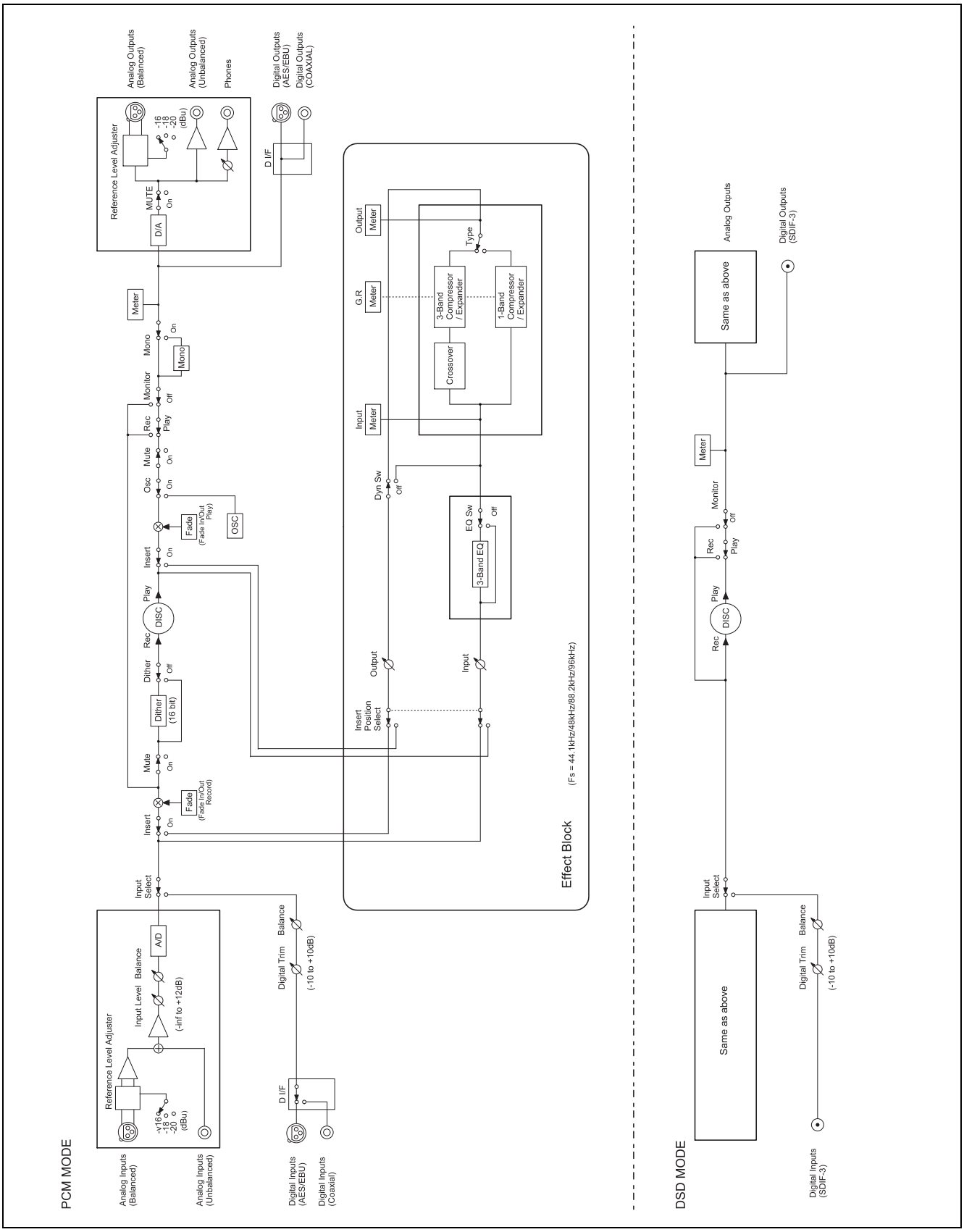


Figure 8.2: Block diagram

TASCAM
TEAC Professional Division

DV-RA1000

TEAC CORPORATION
Phone: +81-422-52-5082 www.tascam.com
3-7-3, Nakacho, Musashino-shi, Tokyo 180-8550, Japan

TEAC AMERICA, INC.
Phone: +1-323-726-0303 www.tascam.com
7733 Telegraph Road, Montebello, California 90640

TEAC CANADA LTD.
Phone: +1905-890-8008 Facsimile: +1905-890-9888 www.tascam.com
5939 Wallace Street, Mississauga, Ontario L4Z 1Z8, Canada

TEAC MEXICO, S.A. De C.V
Phone: +52-555-581-5500 www.tascam.com
Campesinos No. 184, Colonia Granjes Esmeralda, Delegaacion Iztapalapa CP 09810, Mexico DF

TEAC UK LIMITED
Phone: +44-1923-438880 www.tascam.co.uk
5 Marlin House, Croxley Business Park, Watford, Hertfordshire. WD1 8TE, U.K.

TEAC EUROPE GmbH
Phone: +49-611-71580 www.tascam.de
Bahnstrasse 12, 65205 Wiesbaden-Erbenheim, Germany

TEAC FRANCE S. A.
Phone: +33-1-42-37-01-02 www.tascam.fr
17 Rue Alexis-de-Tocqueville, CE 005 92182 Antony Cedex, France

TEAC AUSTRALIA PTY.,LTD. A.B.N. 80 005 408 462
Phone: +61-3-9672-2400 Facsimile: +61-3-9672-2249 www.tascam.com.au
280 William Street, Port Melbourne, Victoria 3000, Australia

TEAC ITALIANA S.p.A.
Phone: +39-02-66010500 www.teac.it
Via C. Cantù 11, 20092 Cinisello Balsamo, Milano, Italy

Printed in China